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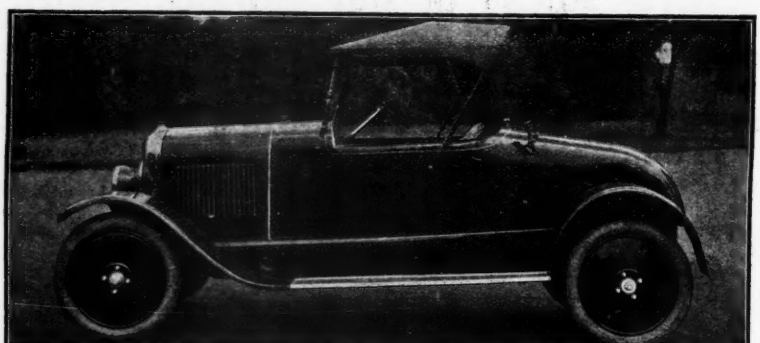

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Table of Contents

ORIGINAL ARTICLES— PAGE.

"Experimental and Clinical Observations in the Treatment of Flaccid Paralysis," by N. D. ROYLE, M.B. 351

REPORTS OF CASES—

"Tetanus," by E. R. ROSEBY, M.B., Ch.M. 360

"A Case of Proctitis with Unusual Features," by R. W. CILENTO, M.D., B.S., D.T.M. & H. 360

REVIEWS—

Anæsthetics in Practice and Theory 361

Anæmia: Its Causes and Modern Treatment .. 362

"Selected Works of Thomas Sydenham" 362

LEADING ARTICLES—

Mine Hygiene 363

CURRENT COMMENT—

The Colloidal Reactions of the Cerebro-Spinal Fluid 364

Retrograde Intussusception After Gastro-Enterostomy 365

ABSTRACTS FROM CURRENT MEDICAL LITERATURE—

Ophthalmology 366

Laryngology and Otology 367

BRITISH MEDICAL ASSOCIATION NEWS—

Scientific 368

MEDICAL SOCIETIES—

The Sydney Hospital Clinical Society 369

The Melbourne Pædiatric Society 370

The Medical Sciences Club of South Australia .. 371

CONGRESS NOTES—

The Australasian Medical Congress (British Medical Association) 373

MEDICO-LEGAL—

Corcoran *v.* Dr. Lilian Cooper 375

SPECIAL CORRESPONDENCE—

London Letter 375

OBITUARY—

Charles Cecil Humphreys 376

Edwin Jeffrey Bird 376

Paul Wilhelm Rudolph Boelke 376

Harold Lytton Cummings 376

PROCEEDINGS OF THE AUSTRALIAN MEDICAL BOARDS—

Queensland 376

MEDICAL APPOINTMENTS 376

MEDICAL APPOINTMENTS VACANT, ETC. 376

MEDICAL APPOINTMENTS: IMPORTANT NOTICE 376

DIARY FOR THE MONTH 376

EDITORIAL NOTICES 376

EXPERIMENTAL AND CLINICAL OBSERVATIONS IN THE TREATMENT OF FLACCID PARALYSIS.[1]

BY N. D. ROYLE, M.B. (Sydney),

Honorary Orthopædic Surgeon to the Lewisham Hospital; Honorary Orthopædic Surgeon to the State Children's Relief Board.

THE treatment of flaccid paralysis presents two outstanding problems:

(i.) The management of the lesion in the nervous system;

(ii.) The care of the mechanism of movement, the denervated muscles and joints which they move.

Each of these aspects has its own problems. In actual clinical practice the loss of power in the denervated muscles has to a large extent overshadowed the other aspects of the lesion and has often determined the type of treatment which is adopted.

The Changes which Occur in Denervated Muscle and Current Methods of Treatment.

The most striking feature of denervated muscle is its loss of power. This is accompanied by a rapid decrease in weight. The wasting is so rapid that a muscle may lose 30% of its weight in fourteen days and as much as 50% of its weight in thirty-five days.[1][2] After this time the rate is not so rapid, but is continuous until the larger part of the muscle fibre element has disappeared. When denervation is continued over a long period, the muscle cells disappear and are replaced by a fatty infiltration. The fibrous structure of the muscle and this fat prevent the loss of weight from falling below a certain figure; the muscle in some cases weighs about 20% or 25% of the original weight. These figures for the rate of wasting are not strictly accurate for the loss of weight in human muscles, but some idea of the rapidity of the process may be judged from them.

Volume and temperature changes[3] also occur in denervated limbs and almost certainly in denervated muscle groups. When the nerves supplying a whole limb are divided, the size of the limb may increase to the extent of 2% of the original volume in a period varying from two to six hours after denervation. Complete recovery from this condition may occur within twenty-four hours and there may actually be an over-recovery within a very short time.

An increase in temperature is also characteristic of a denervated limb. The duration of this increase

[1] Read at a meeting of the New South Wales Branch of the British Medical Association on July 27, 1923.

is very variable, but it may extend over a period of weeks or even months. The final over-recovery or decrease in temperature is usually not more than a fraction of a degree centigrade.

The tone of skeletal muscle disappears with the onset of the denervating process and cannot reappear until the nerve lesion has recovered. In long-standing paralysis the blood vessels themselves undergo contracture, owing to loss of their nervous control and to the decrease in the amount of blood to be carried.

The Effect of these Features upon Treatment.

All the features mentioned above have influenced the course of treatment. Until quite recently wasting was held to be due to inactivity and consequently denervated muscles were obliged to undergo contractions brought about by electrical stimulation. This was held to prevent wasting or to reduce the rate, in addition to maintaining the contractile power in the denervated muscles. According to some writers electrical treatment keeps up the tone of paralysed muscles. This idea is still current, but can only be attributed to confusion of ideas in connexion with the whole subject.

The decrease in temperature and the decrease in circulation have been met by massage to improve the circulation, by hot application of various kinds or by diathermy.

These methods of treatment of denervated muscle appeared to have the sanction of superficial common sense observations on paralysed limbs, but more exact laboratory observations have shed a new light on the subject. Langley was investigating the action of physostigmine[4] when he had brought to his attention the fact that denervated muscle was not inactive. Within a few days after the loss of nerve supply there can be observed a continuous fibrillation. Viewed in a reflected light the whole surface of the muscle appears to be shimmering much in the same way that a sheet of water shimmers to an observer who happens to be looking at the same angle and in line with that of the incident rays of sunlight. The appearance is very similar and is due to the fact that there are rapidly changing depressions and elevations in the surface of the muscle. The condition is well shown in the animals which are here. Denervation of the muscles controlling the ankle joint was carried out about three weeks ago.

This type of activity described as fibrillation comes on within a few days after denervation and probably continues as long as there is any muscle tissue left. The longest experimental observation on this point is about one hundred and twenty-four days.

Langley was not the first to observe fibrillation of this type, but he has invested the phenomena with a new meaning. He conceived the idea that the wasting following denervation was connected with this state of continual activity. There are many facts that lend importance to the idea. A denervated muscle exhibits the physiological characteristics of a fatigued muscle and uses a much greater amount of oxygen than a normal muscle.[5][6][7] The increased oxygen use points to an increased metabolic change, chiefly katabolic in nature. Langley demonstrated that a denervated muscle cannot maintain its structure by undergoing contractions carried out over a period of two and a half hours daily. He also tried the effect of passive movements, massage, feeding with and ionization with calcium salts on the rate of atrophy of paralysed muscles. Following upon Langley's work, Hartman and Blatz carried out a large number of experiments on denervated and recovering muscles to test the effect of treatment. Langley's observations were made by comparing the alteration in weights in the denervated muscles and were applied to both unilateral and bilateral denervation and Hartman and Blatz tested the results of treatment by comparing the amount of work that the muscles could do after various periods of recovery. Some of their treatment was continued for months.

The conclusion of Langley and his collaborators is as follows:

> The general impression we get from our experiments and from those made earlier by one of us is that none of the methods of treatment now in use—passage of galvanic current, production of contraction, passive movements and massage—can have more than a slight effect in delaying muscle atrophy, and that any beneficial effect they may have, could be produced with much less expenditure of time and money than is now spent on them.[7]

G. A. Hartman and W. E. Blatz summarize the results of their investigation in these words:

> Neither massage nor galvanic stimulation appeared to benefit denervated muscle. Neither form of treatment hindered the loss of galvanic response or hastened the recovery of the muscle.[8]

Comments on these Results.

All these experiments with the exception of a few of Langley's were done without an attempt to maintain the denervated muscles in a position of rest. Langley thought that the position assumed by a rabbit in lying approximated to a desirable position of rest for the muscles controlling the ankle joint. In spite of the fact that the muscles were not maintained in a definite position both Langley and Hartman and Blatz found that recovery in the denervated muscles was the rule when conditions of experiment allowed the possibility.

In orthopædic practice the maintenance of denervated muscle in a position of rest has obtained universal acceptance, but there is actually very little experimental evidence to back up the principle. There appears to be, however, overwhelming clinical evidence in support of resting paralysed muscles or of preventing their over-stretching, although it must be admitted that in a condition such as obstetric paralysis it is deformity in contradistinction to actual paralysis of muscles that has to be treated in the average uncared-for patient. Some clinicians are so positive in their belief in maintaining a position of rest that they state that momentary elongation of a relaxed and resting muscle will delay recovery for a considerable time.

Taking into consideration these facts the first points to determine were:

(1) Whether splinting would have altered the results which were obtained by previous experiment.

(2) The nature of the assistance given by splinting to the process of recovery.

(3) The possibility of an optimum position of rest.

In the first series of experiments the plantar flexing muscles of the right ankle and toes were denervated by dividing the nerve at a distance of two centimetres from the entry into the muscles. There were twelve animals in this series and the accompanying table shows the arrangement of the groups, the treatment given and the position in which the muscles were splinted (see Table I.). The obtuse angle means complete plantar flexion with relaxation of the muscles; the acute angle represents complete elongation and the right angle a position mid-way between the normal range of movement. The positions were maintained by means of celluloid splints made on castings. This insured a reasonable fit, but even so the greatest difficulty was experienced in preventing the formation of pressure sores. In three instances treatment had to be discontinued on account of pathological disturbances set up by the splint.

The results obtained in this set of experiments can be seen by consulting the table. There is distinct evidence that the muscles which were splinted, showed signs of recovery before those which had not been splinted. The muscles which were splinted in the fully elongated position, showed signs of recovery about the same time as those which were not splinted at all. It is worth noting that under the conditions in which the animals were kept, the plantar flexing muscles were continually elongated by the position of the animal as it sat in its cage. The animals were not free to run about and for the greater part of the day the habitual attitude was one of sitting with the ankle joint dorsi-flexed. At the seventy-third day the muscles which had not been splinted and which had not received any other form of treatment, appeared in much better condition than those in any other group. This is due to the fact that as soon as tone and regrowth appeared in the muscle, the animal began to use the limb. By far the best recovery appeared in the animal B of group 1 and at this time the recovering muscle was subjected to treatment by means of the Bristow coil. At the end of the one hundred and seventh day animal A of the same group had recovered to a much greater extent than the animal B and the animal C which was last to recover, was actually better than the one which had been subjected to treatment. The figures which appear in the columns headed 90 and 107 days indicate only the number of contractions that the plantar flexing muscles were able to carry out in extending the knee joint under practically the same electrical and mechanical conditions. It is not easy to base any conclusion as regards the efficacy or otherwise of treatment from these figures, because we cannot be certain that the nerve supply recovered to the same extent in the animal B as in the animal A. In this series of experiments the divided ends of the nerves were simply drawn into contact, but not sutured through the actual nerve tissue. This is possible because of the relationship of the different parts of the sciatic nerve at a distance of two centimetres from the entrance into the muscles.

Table I.

Group.	Treatment	Experiment.	Splint Position.	Day of Testing After Operation.					
				42	57	68	73	90	107
1	No treatment ..	A					R	170	240
		B				R	R+	155	120
		C					R	90	140
2	Splint only ..	A	Obtuse angle	R	R+	R			
		B	Right angle			R+			
		C	Acute angle			R			
3	Splint massage, passive movements ..	A	Obtuse angle	R	R	Treatment discontinued.			
		B	Right angle	R	R+	R++			
		C	Acute angle			R			
4	Splint Galvanism and Bristow's Method	A	Obtuse angle	—	—	Treatment discontinued.			
		B	Right angle	R	R+	R++			
		C	Acute angle	—	—	Treatment discontinued.			

R = sign of recovery tested by active movements and Bristow battery.

Two other sets of experiments were done to try the effects of splinting. In the first, four animals were used and the plantar flexing muscles of one side were splinted in a mid-way position of rest and in addition subjected to various forms of treatment. The nerve was crushed at a distance of one centimetre from the entrance into the muscle and the crushing left a gap of about one millimetre which was bridged by the connective tissue of the nerve. This method insures a rapid and complete recovery in the nerve and was used in all subsequent experiments.

The results in this experiment are shown in the accompanying figures (see Table II.) In doing these experiments great difficulty was experienced in adjusting and maintaining the splints in a satisfactory condition and as the dorsi-flexing muscles of the ankle are relaxed when the rabbit sits in a cage, the effect of splinting was tested for this group. This experiment showed practically no difference in the rate of recovery in bilateral denervation with one side splinted and one side free. The explanation is clear and will be discussed later.

These experiments point to possibilities when the difficulties of fixation in animals has been overcome.

Experiments in Treatment of Denervated Muscles.

A large number of experiments in treatment was done in which the anterior group of muscles in the leg of one side was used and the weights were compared with the normal side. Very variable results were obtained and the method was abandoned in favour of bilateral denervation. When the anterior tibial muscles were used, splinting was unnecessary and in each case the treated limb was contrasted with its fellow of the opposite side in the same animal. Both limbs were denervated at the same time and the muscles were in all respects under the same experimental conditions. The supplying nerve was only crushed and recovery in both the nerve and muscles was possible. The tests for the effect of treatment were made by testing electrically and by finding the *post mortem* weights of the muscles under observation. In normal animals there may be a difference of 5% or 6% in weight of the corresponding muscles in the two limbs and any variation which did not exceed this, has to be disregarded.

Table II.

Experiment.	Treatment.	Day of Testing After Operation.			
		24	28	32	39
A	Splint, electrical, etc.	R	R	R+	90
B	Splint, massage, etc.	R+	R+++	Splint removed	250
C	Splint only	—	R	R+ Splint removed	130
D	No treatment	—	—	—	R

In all subsequent experiments in treatment the dorsiflexing muscles, *tibialis anterior* and the dorsiflexors of the toes, were used in testing the effects of treatment. No attempt was made to maintain the muscles in a fixed position of rest.

Experiments in the Rate of Wasting.

Certain observations on the rate and character of fibrillation lead to an attempt being made to ascertain whether the different positions of rest would lead to different rates of wasting. It is a fact that fibrillation is much more evident in the relaxed muscle and disappears with elongation. These experiments were carried out by unilateral denervation and did not yield a definite result. Unilateral denervation is unsatisfactory because of the possibility of growth in the normal limb in some animals as compared with others during the progress of the experiment. In other experiments both hind limbs and trunk of the animal were enclosed in plaster of Paris or celluloid, but these animals almost invariably died. Bilateral denervation in the goat yielded some evidence of rest decreasing the rate of atrophy. An increase in weight of a muscle group can be taken as evidence of recovery, for in these animals the muscles rapidly regain their weight as soon as the nerve supply returns. The electrical method of testing for the return of nerve supply was not very satisfactory. The machines used in most cases were the ordinary Bristow coil and the Lewis Jones condenser. In almost every case active movements returned before normal electro-excitability appeared. When comparisons were made in the response to electrical stimulation the animal had to be lightly anæsthetized, so as to get rid of the animal's participation in the movement. In some cases it was observed where electrical stimulation gave a good response when the animal was conscious, in the unconscious state this was much less. There are four series of experiments worth recording in which bilateral denervation was employed. The treatments which were tested, were massage and passive movements, treatment with the Bristow coil and with the direct current. In addition owing to the generosity of Messrs. Watson and Sons I was able to try out treatment with sinusoidal current

Table III.—Bilateral Denervation—Sixty Days.

Experiment.	Nerve Divided.[1]	Treatment.	Day of Recovery.[2]	*Post Mortem* Weights.	Percentage Difference.
R1	0.5 centimetre silk	Galvanism. Current running against the direction of the growing nerve	L 50 R 50	L 3.1 R 3.02	— 2.5%
R2	0.5 centimetre silk	Galvanism. Current running in the direction of the growing nerve	L 45 R 50	L 2.52 R 2.48	— 1.5%
R3	0.5 centimetre silk	Bristow method	L 45 R 50	L 3.82 R 3.72	+ 2.6%
R5	0.5 centimetre silk	Massage and passive movements	L 45 R 45	L 3.12 R 3.2	+ 2.5%
R6	0.5 centimetre silk	Massage, etc.	L 45 R 45	L 2.395 R 2.305	— 3.8%

[1] In this series a strand of silk was used to crush the nerve at a distance of 0.5 centimetre from its entrance into the peroneal muscles.
In calculating the percentage difference in weight the heavier muscle is regarded as 100.
The right side was treated in this series.
[2] In this column the figures indicate the day on which the muscles responded to a definite test.

of different kinds. Treatment of denervated muscles with diathermy I have not yet been able to complete, excepting in some clinical cases. In all cases special control animals which did not have any treatment, were used. Unless otherwise stated denervation was effected by crushing with a small pair of artery forceps ground to make a gap of one millimetre (see Tables III., IV., V., and VI.).

Discussion of Experiments.

It is quite evident from examining the results obtained in these experiments that no form of treatment made any appreciable difference to the *post mortem* weights. It is also worth while noticing that, while there was no definite improvement, recovery was not retarded by the treatment to which the muscles were subjected. In a few instances histological examination of the recovering muscles was carried out. In those which had been subjected to massage and passive movements, no obvious change was seen, excepting the usual alteration in structure of the muscle fibres themselves after denervation. In those which were subjected to treatment with sinusoidal current, there was some evidence that the muscles had undergone a slight inflammatory change. This was not considerable, but it is interesting to note in this connexion that Langley thought that certain forms of treatment were capable of producing inflammatory reactions and in this way of influencing the *post mortem* weights of treated muscles. Thus it cannot always be said that an increase in weight necessarily proves the value of a form of treatment. It may be only an indication that the structure of the denervated muscle responds by the formation of new fibrous tissue. The macroscopical appearance of muscles in all of these bilateral experiments was much the same, excepting those treated with the sinusoidal current which appeared to be more congested in one or two instances only and these were actually a little heavier in weight than the muscles on the untreated side, but the variation was under 6% in most instances. One exceptional variation occurs in Table IV.; this was probably due to a slight error in denervating.

Table IV.—Bilateral Denervation—Sixty Days.

Experiment.	Treatment.	Recovery.	*Post Mortem* Weights.	Percentage.
L1	Slow sinusoidal	Left side the better	Left 3.19 * Right 3.075	+ 3.6%
L2	Rapid sinusoidal	Both the same	Left 2.545* Right 2.445	+ 4%
R1	Slow sinusoidal with contractions	Both the same	Left 2.315 Right 2.7 *	+ 16.5%
R2	No treatment	Both the same	Left 2.34 Right 2.3	Left 1.7%

* The treated side is indicated by an asterisk.
Recovery was tested with Lewis Jones's condenser.

Table V.—Bilateral Denervation—Thirty-eight Days.

Experiment.	Treatment.	*Post Mortem* Weights.	Percentage.
R1	Slow sinusoidal with contractions	Left 2.36 *Right 2.42	+ 2.5% heavier
R.L.	Slow sinusoidal with contractions	*Left 2.3 Right 2.18	+ 5.9% heavier

Table VI.—Bilateral Denervation—Forty-five Days.

Experiment.	Treatment.	*Post Mortem* Weights.	Percentage.
R2	Slow sinusoidal	Left 2.04 *Right 2.01	— 1.4% lighter
L2	Control, no treatment	Left 2.42 Right 2.49	2.8%
L3 R3	Nerves divided, rapid sinusoidal	*Left 1.15 Right 1.2	— 4.3% lighter

* The treated side is indicated by an asterisk.

Electrical Treatment.

The arguments which are advanced by clinicians in favour of electrical treatment, are commonly based upon observations in such diseases as poliomyelitis. The only information we have from a scientific point of view that an electrical current has any influence in growth is from some as yet unpublished work by Sven Ingvar. In a preliminary note it is said that, working with a current of about 1/250,000 of a milliampère, he was able to influence the growth of animal cells. This current is very minute and the application of such a fact to a clinical treatment is almost impossible. In the first place we have no idea where the current actually travels when it is passed from one end of a limb to another and it is not very likely in the presence of media of very much smaller resistance that it passes through a recovering nerve. In these experiments a current of about three milliampères was passed up the limb of one animal against the direction of the growing nerve and down the limb of the other animal in the direction of the growing nerve (see Figure I.). This treatment neither hindered nor assisted the rate of recovery. The vague effects that are often ascribed to electrical treatment, are too intagible to submit to experiment, but this fact remains that in experiments on mammals the passage of a current of this type makes very little difference.

With regard to those who believe that the contraction of a denervated muscle is necessary to prevent its wasting or to make it ready for the return of the nerve supply, it can be stated that neither the rate of wasting nor the rate of recovery is affected in any way and in addition to that muscles which had been left entirely without treatment through the whole period of experiment, gave in most cases a much better electrical response at the end of the period of treatment than those which had been subjected to treatment by contractions.

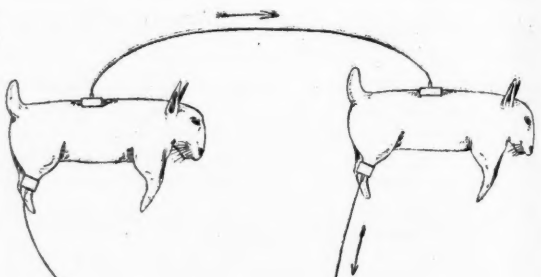

Figure I.
Showing Arrangement of Animals During Treatment with Constant Current.

Muscles without a chance of recovery were not tested. Some authorities on electrical treatment have given up the idea of subjecting denervated muscles to treatment by contractions and have substituted vaguer forms of treatment, such as that afforded by sinusoidal current. Results are attributed to this form of treatment that are very difficult to measure or judge. Slow sinusoidal current, rapid sinusoidal current and sinusoidal currents inducing contractions were all used in these experiments and there is no distinct effect to be ascribed to any of them.

Mechanical Treatment.

Mechanical treatment gives the most definite effects both experimentally and clinically. The rate of recovery of a denervated group can be altered by splinting, but this applies only when the muscles are maintained in a position which approximates their natural postural length. A completely relaxed position is no more advantageous and probably not as advantageous as a position somewhere between the extremes of movement. In the rabbit the plantar flexing muscles of the ankle recovered just as well when the ankle was kept in a right angled position as when the foot formed an obtuse angle with the leg. The completely elongated muscle recovered at the same rate as the muscles which were not splinted at all. In the dorsiflexing muscles, splinting in a midway position of rest did not lead to a more rapid recovery than in the unsplinted groups.

Some authorities contend that the muscle cell itself undergoes detrimental changes when the muscle is elongated, even temporarily. But in the experiments which are recorded in this paper, there is no doubt that the muscles which made the best recovery, were those which were subjected to periodical elongation. It is indeed difficult to see what detrimental effect a momentary elongation of paralysed muscle could produce. There is no more likelihood of the intimate covering of the muscle fibre undergoing elongation than the rest of the fibrous structure of the whole muscle. Instead of

retarding the rate of recovery, passive movements which periodically elongate a denervated muscle, keep the structure of that muscle at an adequate length and actually are a factor in hastening the rate and the degree of recovery. A consideration of the normal range of movement of joints and of the excursion of muscles controlling them does not sanction in most cases the complete relaxation of a muscle as an ideal position of rest. If we examine the hand hanging under the influence of gravity, for example, under normal conditions the tone of the muscles and the length of their fibrous structure tend towards the assumption of a definite attitude. The wrist is slightly dorsiflexed; the fingers are slightly flexed both at the metacarpal and the phalangeal joints, while the thumb occupies a position midway between its ranges of movement. If the radial nerve were paralysed and the extensors of the wrist and thumb and of the metacarpal phalangeal joints were fixed in complete relaxation and maintained in that position, these muscles would go into contracture owing to the adaptation of their fibrous structure to this length. With the return of the nerve supply the range of contraction would be very small, whereas the range of relaxation would be practically nothing. If the muscle had been allowed to recover in a less completely relaxed position, the advent of contractile power would occur in the presence of a much wider possibility of contraction and, if the normal range of the joint had been preserved by passive movement, of a much wider range of relaxation. It is necessary to remember that contracture occurs in paralysed muscles as well as in unparalysed groups if a constant position is assumed. A contracture in an unparalysed group is not due to "overaction" of that group, but is due to the fact that the normal muscles are never adequately elongated by their paralysed antagonists and on account of the plastic tonus tend to assume the position in which their contraction places them. This position becomes permanent on account of the shortening of the fibrous structure of the muscle. Whether the muscle fibre itself actually becomes structurally shorter is still a question for investigation. Flexion contracture of the knee joint never occurs even in the presence of strong hamstring muscles when the patient learns to walk with the knee extended after paralysis of the quadriceps. The accompanying illustration is that of a child whose left deltoid was completely out of action, but at the end of about two months showed fair recovery (see Figure II.) The muscle recovered in the position of complete abduction at the shoulder and when the splint was removed the change in the fibrous tissue of the deltoid had been so great that the arm did not come to lie at the side of the trunk on removing the splint.

FIGURE II.
Showing Posture of the Left Limb after Removal of Splint which kept the Limb in Full Abduction.

This was only a temporary contracture because of the fact that the weight of the limb is continually tending to elongate the deltoid muscle. Subsequently paralysis of the deltoid has been treated by allowing the muscle to recover at an angle of about 45° (see Figure III. and IV.). In this position no difficulty is experienced in getting the full range of abduction again as well as the full range of adduction and both from the point of view of the patient's comfort and the subsequent return of function it appears that a less relaxed position of rest is the best. In connexion with the deltoid, for example, it is highly probable that the muscle would recover adequately in any position of abduction provided the weight of the limb was not allowed to elongate the muscle beyond its ordinary normal postural length. If, however, the muscles are kept in a position of moderate abduction and the adducting muscles are not passively elongated from time to time it will, of course, be impossible to abduct the arm fully, no matter what degree of recovery appears in the deltoid. The ideal thing appears to be to allow the deltoid to recover, so that with a return of tone the muscle has a normal working postural length and at the same time to carry out passive elongation of the antagonistic muscles, so that their length will also be normal. In this connexion the ligaments around jounts which are controlled by paralysed muscles, have also to be kept at satisfactory lengths or, as we say, to be kept supple. If the joints are put through their normal range of movements there will be no difficulty in

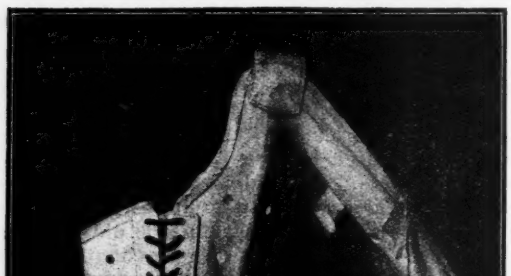

FIGURE III.
Back View of Abductor Splint for Paralysed Deltoid.

providing adequate amplitude for the returning muscular power. To do this, of course, it is necessary that relaxed muscles should be elongated frequently, because their tendons will pass over the joints in question, but as mentioned previously, this has no detrimental effect on the recovering muscles.

Massage and Passive Movements.

The value of passive movements in the treatment of denervated muscles depends upon their ability to maintain adequate ranges of movements in the joints and to prevent contractures both in the paralysed and in the unparalysed groups. Massage does not appear to have any effect in retarding the rate of atrophy or in hastening the rate of recovery in a damaged nerve. In some cases the possibility of causing harm has to be considered. In the facial muscles, for example, there are no definite tendons and the muscles are more or less attached to the skin and if these muscles are subjected to vigorous handling, the possibility of altering their postural length considerably and so retarding the rate of recovery has to be considered. The necessity for keeping up a blood supply in denervated muscles loses some of its force when we consider that an increased blood supply in denervated muscles may simply lead to an increased rate of atrophy. In the actual experiments massage did not produce any increased rate of atrophy and when the massage was carefully carried out, there did not appear to be any detrimental effect produced on the muscle tissue itself when examined macroscopically or histologically. The effect of massage upon the rate of recovery of a damaged nerve does not appear to be great, if there is any at all. A physiological point worth considering is that the rate of tissue metabolism cannot be said to be altered by the rate of circulation, though in the presence of a lesion affecting a peripheral nerve it is not unlikely that factors which tend to increase the rate of circulation, may have some effect in hastening the rate of recovery when all the nerves of a limb are affected together. In all the later experiments normal circulation and temperature were maintained in adjacent groups of muscles and the temperature and vascular changes in the muscles were probably almost normal.

Treatment by Heat.

It is a fact that muscles, both in paralysed and under normal conditions, are capable of working better when a limb is kept warm. This has given rise to various forms of treatment, including whirlpool baths, ordinary hot water and diathermy. I have not yet ascertained whether diathermy makes any difference to the rate of atrophy or to the rate of recovery, but when tested clinically it does not appear to have very much effect upon a recovering muscle. Anyone who has any practical experience in the treatment of poliomyelitis, knows how difficult it is to attribute recovery to anything excepting to the natural process of repair and writers who atrribute results to diathermy, nearly always base their conclusions upon the examination of some such clinical material. In one patient in whom paralysis had existed for a large number of years, treatment by diathermy appears to enable him to do much more work with his defective muscles. But in this as in other mysterious forms of treatment the psychic feature has to be remembered.

Treatment After the Nerve Supply has Returned.

In every case of flaccid paralysis the return of the nerve supply is the most important feature. As soon as this occurs the muscle begins to grow and, if given adequate function, will immediately increase

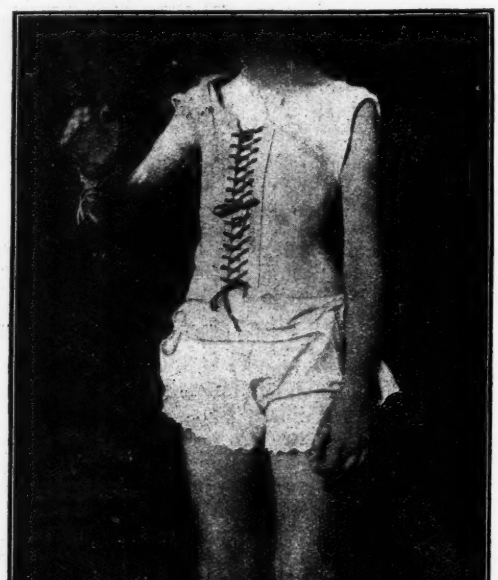

FIGURE IV.
Child Wearing Abductor Splint for Paralysed Deltoid.

in bulk. The length of time taken by a muscle fibre and by a muscle as a whole to regain its normal bulk and strength after the return of its nerve supply may extend into a considerable period, probably more than twelve months. I could not help being struck by the fact amongst military patients after the operation for nerve suture that muscles denervated for long periods would progressively grow and increase in power without any treatment and in many cases it was impossible to say that the treatment which had been given to recovering muscles, had any effect in increasing the rate. In rabbits there was no difficulty in persuading the animal to use its recovering muscles and this accounts for the way in which animals in the first experiment improved when untrammelled by retentive apparatus. It appears really as if the only factor of importance in leading to a regeneration of a paralysed muscle is to provide some adequate method of giving active movements. Provided the normal ranges of movement are preserved and the muscle is actively exercised, adequate recovery will occur in the presence of adequate recovery in the nerve supply. And conversely if there is a definite amount of recovery in paralysed muscles and the range of movement becomes lessened through the production of deformities, the bulk and strength of the recovering muscle will gradually become less.

Fatigue.

Another factor which interferes with the complete recovery of paralysed muscles, is fatigue. Fatigue in itself is probably a normal physiological stimulus to growth and recovering muscles have to be subjected to some form of fatigue or the bulk will never improve. As a matter of clinical experiment a typical instance may be mentioned in which the deltoid had reached the point of being able to produce a minimum contraction, but remained without further progress until the muscle was subjected to exercise which completely fatigued it. This was repeated three times a day. The response was immediate and within eight weeks the deltoid had so far recovered power as to be able to maintain the upper limb in complete abduction. It appears in many instances that the slow rate of progress in recovering muscles is due to the fact that the patient is allowed to go on doing minimum movements without incurring the risk of temporary fatigue. This, however, is to be distinguished from continual fatigue which has undoubtedly the effect of causing the katabolic process to exceed the anabolic process and thus lead to a gradual disappearance of the actual muscle tissue. Some very interesting information on this point has been collected by Lovett and is described in a paper entitled "The Third Year in Infantile Paralysis."[6] Lovett was able to follow the progress of one hundred and eighty consecutive patients under the care of the Harvard Infantile Paraysis Commission. The observations covered the whole three years and led to a number of interesting results. The abdominal muscles, for example, have the poorest outlook as regards recovery and in the lower limb the likelihood of recovery diminishes from the hip to the foot. The recovery is least and improvement slowest in those muscles which have the greatest amount of body weight to sustain in walking. With the production of deformity muscles which were showing considerable improvement, gradually retrogressed and this applied not only to the elongated group, but to those which had undergone contracture as well.

Clinically muscles, such as the extensors of the toes, which have made very fair recovery, are seen to retrogress when called on to do increased work, such as that of dorsiflexion of the foot.

General Conclusions.

It is impossible to conduct experiments in the effect of active movements on recovering muscles, but there appears to be very little doubt that active movement is the normal physiological stimulus both for an increase in growth and an increase in strength and that this is practically the only effective treatment at the present time. We are often left to wonder what is in the mind of the physician or surgeon when he prescribes such treatment as faradic stimulation and massage for a lesion such as obstetric paralysis or facial paralysis. It is, of course, a notorious fact that such treatment is often given without any consideration at all for mechanical conditions necessary for recovery. In the present state of our knowledge the most desirable thing appears to be the maintenance of the denervated muscles in such a position that the returning power is able to operate to a maximum effect and the preservation of the normal ranges of movement. Splinting is necessary to effect this, but the splinting must not be rigid nor must it be continuous. Elongation of a paralysed muscle does not retard the rate of recovery, but there is every indication that muscles which are periodically elongated and whose fibrous tissue is preserved at an adequate length, recover far more quickly than those which are kept in a constant position. Contracture is due not to over-action of the normal groups, but to under-action of the denervated groups and can be prevented by adequate passive movement. Massage is useful in preserving the normal elasticity of the skin, but probably its rôle is very much more important after the actual return of the nerve supply, when the elimination of waste products from an intact muscle is very necessary. The forms of electrical treatment now in vogue have no apparent beneficial result and certainly increase the cost and often the discomfort of treatment. We have yet to find something which will preserve the muscles in a normal condition, so that a returning nerve supply may produce movement immediately and we have also yet to discover the factors which influence the rate of recovery of the anterior horn muscles or of the nerves in their peripheral distribution. At the present time if more attention were directed to the actual nervous lesion, we would get closer to the solution of our difficulties than by directing so much attention upon the denervated muscles.

Acknowledgements.

I would like to express my indebtedness to Professor Hunter for his kindness in placing at my disposal the resources of the Department of Anatomy in which the experimental work was carried out.

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Reports of Cases.

TETANUS.

BY E. R. ROSEBY, M.B., Ch.M. (Sydney),
Gunning, New South Wales.

THE perusal of Dr. Bell's account of two cases of tetanus recently, impels me to report the following:

Mrs. F.B. was resting in bed threatened with miscarriage. On the evening of July 24, 1923, she had a serious hæmorrhage and when then seen was almost pulseless and had fainted. She presently rallied sufficiently to allow of the removal of a six weeks ovum and was curetted and plugged. About six hundred cubic centimetres of saline solution were injected under the right breast. Next evening the temperature was 40° C., the breast being painful and reddened.

Twenty-four hours later the temperature had dropped to 37.8° C., the breast looked less angry, but abscess formation was anticipated.

She improved till the seventh evening when she complained of stiffness of the jaw and pain and stiffness of the back of the neck and later similar stiffness of the muscles of the left hand. She was seen about three hours after the onset of these symptoms and then could open her mouth about half the normal extent, but with pain and stiffness.

The abscess which had formed in the breast, was opened and about thirty cubic centimetres of pus and some gas bubbles escaped.

I injected three thousand units of tetanus antitoxin (all I had) into the right pectoral muscles.

Next morning the jaw felt easier, though she still had some stiffness of the back of the neck and hand.

During the next twenty-four hours, without any further antitoxin, these symptoms gradually disappeared.

In this case, the breast infection was evidently due to the saline solution containing tetanus bacilli from a septic douche can. Whether the rapid improvements after opening the abscess was due to draining away the bacilli and toxins or to the small dose of antitoxin is problematical. But it illustrates that tetanus can be just as mild sometimes as at other times it is severe.

A CASE OF PROCTITIS WITH UNUSUAL FEATURES.

BY R. W. CILENTO, M.D., B.S. (Adel.), D.T.M. & H. (Lond.),
Director, Australian Institute of Tropical Medicine, Townsville, North Queensland.

I AM indebted for the following particulars to the courtesy of Dr. E. Humphry, of Townsville, and of Dr. T. Mansfield, of Ayr. On June 7, 1923, the patient in question called for examination; the following particulars were obtained.

A.B., *ætatis* nineteen, a clerk, resident at Ayr, stated that about twelve months previously he first became aware of a small tumescent patch, somewhat tender, situated immediately posterior to the anal sphincter and wholly outside the anus itself. There was a slight tenderness on passage of a motion and some tenesmus. Without affecting his general health, the patch became somewhat larger, horseshoe-shape and finally circumanal. It began to be somewhat painful with considerable occasional itching. There was also a slight discharge, tending to form crusts of inspissated pus. The patient's general health continued good and in spite of treatment there seemed no tendency for the activity of the lesion to diminish. During the year he lost weight slightly and states that he noted some sweating at nights in excess of his usual habitus. He was aware, too, of easy fatigue and a persistent though trifling cough.

Previously, his history was of little account, except that he had suffered as a child with adenoids, subsequently with whooping cough at the age of five or six years, but most importantly, that two years previously he had had a slight three-day attack of influenza with a very tardy convalescence and a tendency subsequently to the acquirement of heavy colds from slight exposures. The patient who admitted certain promiscuity in his sexual relationships, denied any veneral infection, volunteering the statement that he used preventives, the operation of which he confined to the glans and prepuce.

On examination the patient was found to be a sallow, somewhat freckled, lank-haired adolescent, bearing facial evidences of his adenoid history. The chest was poorly developed and flattened anteriorly. On examination the chest note was found to be somewhat impaired throughout, more particularly at the angles of the scapulæ posteriorly and over an area corresponding to the third interspace anteriorly on the left side. Slight râles were detected at both apices. The chest movements in breathing were poor. Otherwise the examination did not reveal any pathological change.

With regard, however, to the actual seat of lesion, it will be seen from the illustration that a raised granulomatous perianal area of infiltration advancing to, but not apparently involving the rectum, was apparent. The cleft of the nates tended to limit the extent of the affected area, the edges of which were marked by a crust of offensive, dried pus. The surface was moist, with a thin discharge. No ulceration extending below the surface epithelium had occurred.

Diagnosis.

The diagnosis of the case presents several features of interest. In any case of granulomatous or other inflammations in the anal area occurring in the tropcs, one thinks naturally of acute and chronic catarrhal proctitis, gonorrhœal, syphilitic or tuberculous proctitis, malignant disease and ulcerated granuloma of the pudenda. Catarrhal condiditions were taken to be excluded by the chronicity of the condition, the absence of apparent cause, the absence of tenesmus, pain *et cetera* and the intractability.

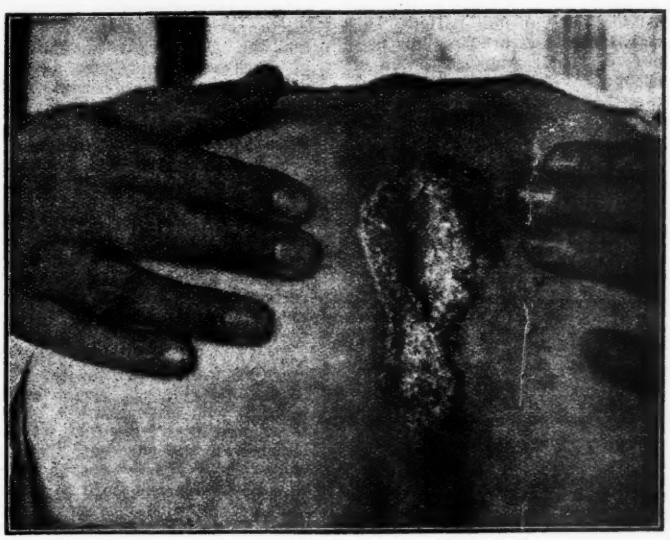
Syphilis was excluded by repeated failure of the serum to fix complement in the Wassermann test. Malignant disease was contraindicated by the youth of the patient, the nature of the lesion and the slowness of its progress.

Granuloma venereum was excluded by the history, lack of ulceration and the appearances of the lesion. There remained gonorrhœal proctitis and tuberculous proctitis.

From the history and the chest signs it was anticipated that the diagnosis was probably tuberculous proctitis and a sample of sputum was taken for examination, together with a small section of the granulomatous tissue. At the same time smears were made from the discharge found in the lesion and sent for examination for gonococci. *Bacillus tuberculosis* was found in the sputum and a Gram-negative diplococcus, morphologically identical with gonococcus, was detected in the anal smear in large numbers.

It appeared from this examination that the case might be one of mixed gonococcal and tuberculous infection. Both gonorrhœal proctitis and tuberculous proctitis, however, being rare, their coexistence was regarded as improbable and further experiments towards identification of the diplococcus were put in hand. There was no direct evidence of unnatural practice in the case under review and such were denied. Moreover, there had been none of the early œdema, pain, swelling of the parts, tenderness and so forth for which one looks in cases of gonnorhœal infection. Also the infection did not involve the mucous areas and the implantation of the gonococcus must necessarily have occurred, therefore, upon a skin area or upon some break in its continuity, such as a chafe or abrasion, if present as an infecting organism.

Emery, in his "Clinical Bacteriology and Hæmatology," refers to an organism closely resembling the gonococcus, but a little larger and more variable in size, which he believes to be *Micrococcus catarrhalis*. After several attempts, the diplococcus, to which reference has been made above, was successfully grown, the difficulty in its cultivation being regarded as a point in favour of its being the gonococcus. However, it failed to ferment glucose and on further investigation definitely proved not to be the gonococcus, though morphologically, it was apparently identical.



Tuberculous proctitis is not uncommon and is usually secondary to pulmonary disease. It is stated, however, that the lesion may be primary, the bacilli entering with the food. Commonly the disease manifests itself by tuberculous fistulation, the external orifice of the fistula being merely characteristic of a tuberculous sinus, a thin and watery discharge being present, and the internal opening being easily felt, as a rule, or seen *per rectum*. More rarely, there is a variety of tuberculous involvement, in which tubercles are deposited in the mucous or submucous tissues of the bowel wall, with degeneration, and finally ulceration. This condition, however, rarely presents externally, though it may spread to the anal canal and destroy the sphincters by ulceration.

The third variety of tuberculous disease is rarest of all and is that type which most nearly concerns us in the present instance. The inflammation is limited to the skin of the anal canal and the immediate perianal region. When occurring, the disease is very chronic, involves the anal canal, does not tend to spread to the mucosa and the appearance resembles that of hypertrophic lupus. The bacilli are difficult of detection in the lesion, but the microscopic structure of the granuloma is characteristic.

It will be seen that this description of the perianal form of cutaneous tuberculosis precisely mirrors the condition which was found in the patient under consideration.

Reviews.

ANÆSTHETICS IN PRACTICE AND THEORY.

CONSIDERABLE interest is aroused by the appearance of a new text-book on anæsthetics by Dr. Bloomfield, owing to the success of his previous production, the well known hand-book. The text-book is necessarily a much more ambitious project than the hand-book and it ranks in a more cumbersome class of tome. Yet on reading it one is not impressed by such a feeling, since the matter has been handled with experience and thereby much unnecessary detail and redundant verbiage have been eliminated and clear and attractive reading has been produced.[1]

All the important descriptive matter is well and clearly stated whilst opinions and directions are sound and good. Statements open to question are met with in very few instances, but in each it is concerning material that has no important bearing. The book is one of the latest records of approved practice in which are included the recent innovations in methods and apparatus. A moderately successful effort has been made to harmonize the more or less widely divergent results of the many researches in the field of the physio-pathology of anæsthetics, especially of chloroform. This, however, is a matter of considerable difficulty, even of impossibility. There is no preface, but a brief introduction is inserted in the opening pages of the first chapter. This is followed by a history of the evolution of the practice of surgical anæsthesia. The second chapter is taken up by a review of various theories as to the mode of action of anæsthetics, the whole of which, however, fails to afford much enlightenment. It is probable that until the physiology of sleep is understood, but little progress can be expected. The next chapter deals with the chemical and physical characters of practically all of the agents hitherto employed for the production of surgical anæsthesia. Most space is given to directions for practical administration in excellent chapters on the administration of ether, nitrous oxide, chlorform, ethyl chloride, their mixtures and sequences. The methods for the administration of the lesser known agents are more briefly detailed. The important subject, "choice of the most appropriate anæsthetic" for special operations—emergency, æsthetic, on the nose, mouth, throat, chest and abdomen, for example, such as usually demand experience and mature judgement—is well treated. A chapter is devoted to the discussion of the value of the preliminary employment of narcotic and other drugs; another to emphasize the value of posture in certain operations and in circulatory failure. Under the comprehensive heading "undesirable conditions occurring during anæsthesia," are discussed all possible difficulties and indications of danger, with their treatment. A chapter deals with accidents and complications following anæsthesia. The technique of local spinal and sacral anæsthesia is amply detailed in two chapters. The last

[1] "Anæsthetics in Practice and Theory," by J. Blomfield, O.B.E., M.D.(Cantab.); 1922. London: William Heinemann (Medical Books), Limited; Royal 8vo., pp. xii. + 424, with 48 figures. Price: 25s. net.

chapter is devoted to fatalities of anæsthesia. This book is well and attractively written, the paper and print are good and it is well illustrated. It is a text-book well suited to the needs of the student and the practitioner and can be confidently recommended as such.

ANÆMIA: ITS CAUSES AND MODERN TREATMENT.

Throughout his little book, "Anæmia: Its Causes and Modern Treatment,"[1] Dr. A. W. Fuller lays stress on the importance of recognizing the part played by early simple anæmia in many illnesses. Chilblains, cold extremities, inability to stand fatigue and a lowered resistance to infection are stated to be symptoms of the first degree of anæmia which is seldom diagnosed, but which vanishes rapidly when iron is administered.

The further stages on the way to severe anæmia are outlined and the various causes of this condition are mentioned. Treatment is dealt with in some detail. The use of the ordinary inorganic preparations of iron by mouth is deprecated, though "Idozan," "Ferrophytin," "Fowler's Solution," "Dimol" and hæmoglobin are considered useful. Transfusion receives scant mention as the early phases of anæmia receive most attention. The subcutaneous injection of a combination of iron, arsenic and strychnine in isotonic serum is strongly advocated for every anæmic patient. This advice would be more useful if the exact preparations used and the dosage were definitely stated. Apparently the injections are given every second day for six weeks.

In the last chapter the author deals with neurasthenia and emphasizes the fact that treatment of the anæmia often present in this and also in many other conditions will lead to gratifying results. This is the keynote of the whole book.

A few obvious errors such as the statement that there are twelve hundred leucocytes per cubic centimetre require correction. The book may be read with profit in an idle hour.

"Ἦν γαρ παρῇ φιλάνθρωπιη, παρεστι καὶ φίλοτεχνιη."
("The love of humanity associated with the love of his craft.")—Hippocrates.

As welcome evidence of the recent increase of interest in the history of medicine comes this excellent little volume by Dr. J. D. Comrie, of Edinburgh University, on Thomas Sydenham. An appreciation of Sydenham's personal characteristics and clinical worth is aimed at by the author. An attractive, brief and well-balanced biography precedes a selection of the more interesting extracts (about one-third) from his writings and the whole volume is neatly printed and turned out as a suitable candidate for every practitioner's library.[2]

Sydenham's life story is singularly appropriate at the present juncture, for like so many students today his medical studies were seriously interrupted by a great war. Torn away from Oxford in the first year of his course he bore arms as a combatant officer in the Puritan forces during the civil war and was on one occasion left for dead on the battlefield. With the post-war period he resumed his studies at Oxford and was elected a Fellow of All Souls. At the age of thirty-one he established himself in London (1655) where he practised successfully for about thirty-four years. The restoration of the monarchy (1660) must have appeared to him an ill-omened change, for his whole family had been very closely attached to parliamentary anti-royalists and to the Commonwealth. This may have influenced his decision to tour on the Continent in 1659 and 1660 and this produced distinct broadening of his mental outlook.

In the history of every nation at some period a man arises who embodies in himself the genius of the race and yet belongs not so much to his own age as to all ages. Such was Thomas Sydenham. Before his time, no doubt, lived many great physicians, but their minds were too much overlaid with ancient traditional medical theories. One has only to compare the writings of that most famous medical author Sir Thomas Browne, a contemporary of Sydenham's early days, to appreciate the remarkable "up-to-dateness" of Sydenham's outlook and his constant reliance on first hand facts. Already the dawn of scientific medicine had been proclaimed, thanks to the work of Harvey; and men of genius Mayow, Wren, Boyle, and others, were through the new Royal Society laying the foundations of the modern experimental sciences—physics, chemistry and physiology. Though he probably knew quite well the work of the theorists, Sydenham disregarded these new gropings after truth. Concentrating on the bedside study of the life history of disease he devoted himself to careful clinical observations and common sense inferences, thus referring back to Hippocrates for guidance. So was laid down for us, his descendants in the art, that first hand knowledge of the human reaction to the agents of disease which has become the peculiar glory of English clinical schools and justifies Sydenham's title of the father of English medicine.

It is to "honest and good" Doctor Sydenham we owe many advances in practice. The principle "*contraria contrariis curantur*," the cooling methods in fevers, the introduction of quinine (Peruvian bark) into general use, the proper use of opium, the classical description of the gout and one of the first if not the first study of epidemic cycles of disease incidence are a few of his more noteworthy achievements. His description of the gout is all the more telling as the result of many years of direct personal experience. It is indeed a pity that more of our clinicians do not describe their ailments in their autobiographies. We can only guess at his powers of intuition and his great personality, his adherence to the Hippocratic model as the basis for a great clinical renaissance is well exemplified in his own words. For among medical writers, excepting Hippocrates and a few others, we meet with little to assist us in our inquiries into so intricate a subject; the assistance and light which authors promise, are rather false than true lights which tend to mislead and not to direct the mind in its researches after the genuine procedure of Nature.

His love of humanity associated with the love of his craft is well shown in the following quotation: "But in the first place I must observe that I have met with several, who either with a good intent in order to deter the incontinent from their vicious practices by the apprehension of the succeeding punishment or to acquire the character of chaste persons themselves have not scrupled to assert that the cure of venereal disease ought to be kept secret. But I cannot be of their opinion, because I conceive that there would be very little room left for charity or doing good offices unless the misfortunes that thoughtless persons bring upon themselves by their own fault were to be alleviated with humanity and tenderness. It belongs to God to punish the offence, but it is our duty to assist the distressed and relieve the diseased to the best of our power and not to make too strict inquiry into the cause of the evil and irritate them by our censures. For this reason, therefore, I will deliver what I have observed and experienced in this disease, not that I intend to make men's minds more vicious, but to cure their bodies which is my province." There spoke the broad-minded, humane man of action. Can one doubt that a similar spirit would imbue his writings were he to arise today to deal with our much vexed modern problem of venereal prophylaxis?

Perhaps nothing enlarges more our appreciation of his personality than his friendship with John Locke and the high opinion that great philosopher and physician formed of his compeer in the profession.

As typical of the whole character of the man, his sincerity of purpose, his seriousness of thought, his devotion to his life work, we can do no better in conclusion than record Sydenham's own chosen quotation inscribed in his own handwriting on the flyleaf of his manuscript: "Medical Observations: Whatsoever thy hand findeth to doe, doe it with thy might; for there is noe worke, nor devise, nor knowledge, nor wisdom in the grave whither thou goest.—Eccles 9° 10°. London Martii 26° 1669."

[1] "Anæmia: Its Causes and Modern Treatment," by Arthur W. Fuller, M.D. (Edin.); 1923. London: H. K. Lewis & Company, Limited; Crown 8vo., pp. 64. Price: 3s. 6d. net.

[2] "Selected Works of Thomas Sydenham," by John D. Comrie, M.A., B.Sc., M.D., F.R.C.P. (Edin.); 1922. London: John Bale, Sons and Danielsson, Limited; Demy 8vo., pp. 153, with four plates. Price: 8s. 6d.

The Medical Journal of Australia

SATURDAY, OCTOBER 6, 1923.

Mine Hygiene.

The principal object of the Pan-Pacific Science Congress, as has already been pointed out in these columns, was to bring the workers in the several countries concerned into close contact and to create some form of coordination in the work. The promotion of the study of scientific problems of interest common to all countries bordering on and included within the Pacific Ocean is a laudable and admirable aim, but when the first place is given to those matters that are primarily concerned with the human population of those countries, it must have a direct appeal to the medical profession. In these circumstances we have not hesitated to devote practically a whole issue to that part of the proceedings of the Congress that come under the category of hygiene. The report published last week contains so much valuable information that no further justification is needed.

Among the subjects discussed that of the hygiene of mines occupies a large space. It is apparent at once that this subject is extremely complex and involves very many branches of hygienic study. The question of the special hazards attached to a miner's occupation depend on the nature of the mine itself, whether it be a coal mine, a gold mine, a copper mine, on the general physical disposition of the working places, on the temperature, on the provision of adequate or inadequate lighting, ventilation and sanitation, on the employment of means to reduce dust and gases, on the hours of labour in conjunction with the conditions of work, on adoption of special precautions calculated to minimize special local risks, on the recognition by the miners themselves of the need for special care under certain conditions, on the proper selection of the man for the job and on the continuous control of the health of the men. Each of these sub-divisions is in itself so complicated and extensive that it has attracted the whole energies of experts and commands a considerable literature. For example, there has been much research into the causation of miner's nystagmus and this research has given rise to controversy. The Medical Research Council's special committee appointed to deal with this important subject has just issued its second report. This matter will be discussed at a future date. Again the question of dust involves several distinct problems. In the first place there is the task of measuring the amount of dust at the level of the workers' heads when they are at work. In the second place the chemical composition of the dust is a matter of vital importance to the man exposed to it. Not only is it necessary to determine its chemical composition, but it is essential that its physical characters also be studied, for a heavy dust comprising large particles which tend to fall rapidly to earth, is usually less dangerous than a lighter material floating in the atmosphere in a state of fine division. Moreover, in these conditions particulate matter may include noxious gases which enhance the danger of its presence. It must be evident to all that the members of the Pan-Pacific Science Congress only touched on a few of the many aspects of mine hygiene and in no instance have they exhausted the sources of information concerning the special matters selected for debate.

It is a concern of the medical profession to study all these problems with care and attention, even in the absence of an immediate application of the knowledge disclosed. It must be remembered that in the elucidation of these problems contributions to knowledge may be made in circumstances far removed from underground work. The incidence of silicosis and its significance can be studied in flint knappers, in steel workers and in men in many other trades. The contributions to Congress and to other metings in Australia by Dr. W. Watkins-Pitchford on the ætiology and pathology of silicosis should act as a stimulus to those trained observers in Australia who have the opportunity of tracing a noxious agent from its entrance into the human body to the tissues where it exerts its bane influence. We are under a deep obligation to Dr. Watkins-Pitchford for having come so far to attend this meeting. He has taught us much. Professor C. J. Martin, F.R.S., has also earned the gratitude of the

medical profession and of those other scientists whose work is connected with industrial hygiene and the welfare of the human race, for his attendance and contributions. In connexion with the subject of silicosis it may be well to call attention to the fact that the members of the Technical Commission of Inquiry whose admirable work at Broken Hill has been discussed in these columns, conducted Dr. Watkins-Pitchford and others after the meeting to Broken Hill for the purpose of witnessing a demonstration of the special manifestations of pneumonoconiosis in the Broken Hill miners.

The Congress has indicated the nature of the special problems in mine hygiene and has awakened the interest of the medical profession in these matters. From time to time opportunity presents itself for the examination of one or other of these special problems. This will be done in this journal in order to maintain that interest.

Current Comment.

THE COLLOIDAL REACTIONS OF THE CEREBRO-SPINAL FLUID.

Over ten years ago Lange published the details of a test he had devised involving a reaction between the cerebro-spinal fluid of syphilitics and others and a colloidal solution of gold. The test is known as the gold sol test. Lange showed that the cerebro-spinal fluid of a person suffering from general paralysis of the insane or from locomotor ataxia induces a precipitation of the gold from a properly prepared colloidal solution of the metal in certain dilutions. Much speculation has been offered concerning the physico-chemical nature of the precipitation. At the present time no exact information is available on this point. The test has aroused much interest, but has not gained popularity as a diagnostic means. The reason for this is not far to seek. In the first place the preparation of the solution is very difficult. In the second place the laboratory workers have introduced an extraordinary complicated and confusing annotation in regard to the results. The practitioner of medicine has hitherto had no opportunity of forming an opinion as to the value of the test in diagnosis or prognosis. The series of numbers given to him by the laboratory man conveys little or nothing to his mind. And even when he is told that the curve represented by these numerals is a typical "paretic," "meningitic" or "tabetic" curve, he is naturally disinclined to be deeply impressed, because even the laboratory workers refuse to speak with emphatic conviction of its significance. There is no doubt at all that Lange's reaction represents a definite physico-chemical phenomenon which may be of considerable value in clinical practice. There is also little doubt that until the annotation is changed, the test will not become popular. The cerebro-spinal fluid of a normal person does not call forth any precipitation or calls forth very little in any dilution raging from one part in ten parts to one part in ten thousand, two hundred and forty parts. The typical response of the cerebro-spinal fluid of a person suffering from general paralysis of the insane in the language of the laboratory is 555 523 321 000. The meaning of this is gathered from the manner in which the test is performed. Twelve test tubes of equal size are placed in a row. In the first 1.8 cubic centimetres of saline solution are placed and in the other one cubic centimetre. To the first test tube 0.2 cubic centimetre of cerebro-spinal fluid is added. One cubic centimetre of the mixture is then transferred to the second tube; then one cubic centimetres of the mixture in the second tube is transferred to the third and so on until the eleventh test tube is reached. From this one-half the mixture is discarded, so that each test tube contains one cubic centimetre of fluid, the first eleven being dilutions of cerebro-spinal fluid of 1 in 10, 1 in 20, 1 in 40, 1 in 80 and so on to 1 in 10,240, while the twelfth is a control with no cerebro-spinal fluid. Five cubic centimeters of colloidal gold solution is added to each tube and the mixture shaken at once. Complete precipitation of the gold leaving a colourless supernatant fluid is regarded as 5; when the supernatant fluid is pale blue, that is when nearly all the gold has been precipitated, the response is numbered 4; when the fluid becomes blue in colour, the response is numbered 3; when the fluid changes colour to violet, it is numbered 2; when there is only a slight change in the original red colour of the gold solution, it is spoken of as 1; while when no change occurs, the annotation is 0. The laboratory worker reads his twelve test tubes from left to right, starting with the dilution of 1 in 10, and gives the numbers according to this method of expression in sets of three. In view of the fact that two qualities have to be expressed, the dilution of the fluid and the degree of precipitation, the laboratory workers seeks this short cut. Practitioners of medicine have become accustomed to the expressions, complete, nearly complete, partial, trace, slight trace and no reaction. It would, therefore, be more descriptive and helpful if the so-called typical paretic curve were expressed as complete precipitation in dilutions of 1 in 10, 1 in 20, 1 in 40, 1 in 80 and 1 in 160, partial precipitation in dilutions of 1 in 320 and 1 in 640, a trace of precipitation in a dilution of 1 in 1,280, a slight trace of precipitation in a dilution of 1 in 2,560 and no precipitation in all weaker solutions.

The solution is made by boiling one hundred cubic centimetres of perfectly pure distilled water in a chemically clean Jena gass flask, adding one cubic centimetre of a 1% solution of chloride of gold, then adding one cubic centimetre of a 1.4% solution of potassium carbonate and lastly after the solution has been removed from the flame one cubic centimetre of a 1% solution of commercial "Formalin." The potassium carbonate must be thor-

oughly desiccated before the solution is prepared, as it is hygroscopic. The distilled water must be free of even a trace of impurity. The still should be a copper one.

Many observers have noted aberrant results, assuming that the "paretic," "tabetic," "meningitic" and other curves are diagnostic of these conditions. It has not yet been proved that the cerebro-spinal fluid of a person suffering from general paralysis of the insane or from *tabes dorsalis* or from meningitis produces a regular degree of precipitation of the gold according to the dilution. It is more probable that the chemico-physical character of the cerebro-spinal fluid which is responsible for the precipitation, varies with the patient and with the stage or intensity of the pathological process. All that can be stated from the information available at the present time is that in general paralysis of the insane the maximum precipitation tends to occur in the first four or five dilutions, that in locomotor ataxia the maximum precipitation occurs with a dilution of the cerebro-spinal fluid of 1 in 40 or 1 in 80 and that in tuberculous meningitis and possibly simple meningitis the maximum precipitation (which is rarely complete) occurs in dilutions of 1 in 320 or 1 in 640. It is by no means rare to find samples of cerebro-spinal fluid from patients suffering from these conditions which either yield results fundamentally different from those said to be characteristic of the special conditions or fail to give rise to precipitation in any dilution. In recognition of these anomalous results of the tests Drs. H. D. Wright and W. O. Kermack have endeavoured to ascertain whether the aberrant reactions or rather curves are ascribable to qualities of the cerebro-spinal fluid or to varying sensitiveness of the sol.[1] They recognized that if they compared the results of other colloidal tests with those of the gold sol test, information would probably be obtained. At the same time they admit that until these tests are repeated many times over long periods with the cerebro-spinal fluid of the same patients, it will be impossible to decide whether or not the successive stages of the syphilitic and tuberculous diseases are characterized by special curves. They selected the colloidal benzoin test of Gullain, Guy-Laroche and Lechelle (see THE MEDICAL JOURNAL OF AUSTRALIA, August 19, 1922, page 219). The cerebro-spinal fluid of nineteen persons whose central nervous system was regarded as normal, manifested little or no power to precipitate gold in Lange's test. In the colloidal benzoin test some precipitation was obtained at times in the seventh or eighth tubes (1 in 64 or 1 in 128). In regard to the cerebro-spinal fluid of general paralysis of the insane, the gold sol curve was typical ten times out of twenty. The benzoin curve regarded as typical was encountered in eight of the samples which yielded the typical gold sol curve. They found that aberrant results were even more common with the benzoin test. They do not think that the atypical responses are due to variations in the reagents, but are inclined to ascribe them to variations in the disease processes. Their results indicate that neither of these tests can be utilized at present as diagnostic measures. Together with other signs and reactions of the disease, these two tests may prove of use. In *tabes dorsalis* the benzoin test yields but little precipitation. In two instances they obtained a considerable amount of precipitation. The cerebro-spinal fluid of both patients yielded an almost typical "paresis" curve, although the diagnosis of general paralysis could be excluded. There seems to be a general agreement in the responses to the two tests in tuberculous and purulent meningitis. In encephalitis no precipitation was seen with either test. They also studied the responses in disseminated sclerosis. Some precipitation was obtained with the cerebro-spinal fluid of three out of seven patients. The response was more evident with the gold sol test than with the benzoin test. They conclude from their observations that no special curve can be accepted as typical of any particular disease. They advocate further investigation, especially with the benzoin test, as the simpler and more easily performed, since a study of a series of cases over a long period may give useful information. It will certainly be of value to discover the actual physico-chemical basis of these obscure precipitations.

[1] *Edinburgh Medical Journal*, August, 1923.

RETROGRADE INTUSSUSCEPTION AFTER GASTRO-ENTEROSTOMY.

RETROGRADE intussusception, though rare, has been reported as occurring in almost all parts of the alimentary tract. Among the complications following gastro-enterostomy it is of relatively infrequent occurrence, but the clinical picture presented would appear to be characteristic. Dr. Hamilton Drummond has reported an instance of the condition and has collected the histories of eleven others from the literature.[1] The history of his patient resembles that of many of those reported by him. Gastro-enterostomy was performed for stenosis of the pylorus in 1906. A second gastro-enterostomy was performed in 1909 because the first stoma had become partially occluded and symptoms had returned to a large extent. In 1922 the patient was suddenly seized with acute abdominal pain soon after taking food. The vomit soon after the commencement of the illness contained blood. No fever was present and no tenderness or distension. No mass was palpable. This absence of a palpable tumour is not invariable. At operation it was found that almost two metres of small gut had been intussuscepted into the stomach. Reduction was easily performed and at a subsequent operation a third gastro-enterostomy was done. It would appear that the type of gastro-enterostomy performed in the first instance is not a factor in the causation. Dr. Drummond suggests that the cause of the condition may be the too rapid emptying of the stomach. He thinks that the acidity of the stomach contents may cause irritation of the jejunum and that this in turn will set up anti-peristaltic action. His description of the condition should lead to more accurate diagnosis.

[1] *The British Journal of Surgery*, July, 1923.

Abstracts from Current Medical Literature.

OPHTHALMOLOGY.

Ophthalmia Neonatorum.

L. Lehrfeld (*American Journal of Ophthalmology*, May, 1923) has published and analysed the statistics of the incidence of *ophthalmia neonatorum* during the last twenty and more years and has arrived at the conclusion that the preventive measures have failed to prevent or even diminish the amount of blindness from this disease. The children in the blind schools who owe their blindness to *ophthalmia neonatorum*, still form from 20% to 30% of the total. It was found that the incubation period, usually from three to seven days, may be as long as two weeks. A large proportion of the new born do not receive any prophylactic instillation. The author advocates several new measures, namely the antenatal treatment of women; the instillation of several drops of "Argyrol" solution (25%) on three successive days after birth, followed by flushing of the eye; compulsory use of prophylactics; extension of time from two to four weeks for the report of patients suffering from sore eye and the following up of repeated instances of infection by health officials.

Iridotasis Operation for Glaucoma.

M. Goldenburg (*American Journal of Ophthalmology*, May, 1923) is converted to the belief that iridotasis is the best operation for glaucoma. A large conjunctival flap is separated downwards and the anterior chamber opened by a keratome making an incision of four millimetres. The iris forceps grasps the iris midway between the pupillary border and the root and draws it into the corneoscleral incision, care being taken to draw the iris into both ends of the incision as much as possible. The conjunctiva is united with one or two sutures. Atropine is instilled for a few days. The author has practised this procedure for five years and believes it gives the best drainage and the best results.

Kerato-Plastic Surgery.

A. E. Forster (*American Journal of Ophthalmology*, May, 1923) presents an historical survey of the various attempts to cure corneal leucoma by the transplantation of healthy corneal tissue. Use was generally made of an animal cornea, but recent work in the transplantation of tissue has established the principle of the individual specificity of tissue. His own experiments in conjunction with C. R. Bridgett indicate that in cats an equilateral triangular piece of the whole thickness of the cornea could be removed and replaced with the angles reversed. They believe that transplantation from another species is a biological impossibility. The use of oil, advocated by Ebeling and Carrel, is of value possibly by preventing the aqueous gaining entrance to the tissue spaces.

Suture in Trephining.

R. Foster Moore (*The British Journal of Ophthalmology*, June, 1923) believes he has discerned a way to avoid the localized cyst-like bleb over a trephine hole. His method consists in applying a fine continuous silk suture throughout the conjunctival incision. This has the effect of causing a rapid formation of the anterior chamber also a distension by aqueous under the whole flap. The whole extent of the flap is thus prevented from becoming sealed down to the underlying tissues and a wide area of filtration is produced. A bleb is an indication of poor drainage. In only one among twenty-two patients operated upon in this way has a bleb formed.

Treatment of Conical Cornea.

C. Killick (*The British Journal of Ophthalmology*, June, 1923) gives his experience with the last six patients under his care suffering from corneal cornea. Pressure bandage and a tonic will restore corneal transparency, but has no curative effect. Cauterizing the cone either with or without perforation has not in the author's hands been successful. His best success was in a woman of forty-nine years whose almost clear lens he removed under a sub-conjunctival bridge. A vertical linear needling was subsequently done. This gave a vision of $^6/_{24}$ with a five diopter concave lens and a small cylinder. The vision before was less than $^6/_{60}$.

Blue Cataract.

R. P. Ratnaker (*The British Journal of Ophthalmology*, June, 1923) reports two instances of blue cataract. This form of cataract produces no black spots against the red background of the fundus, nor do the opacities interfere with a clear view of the fundus by the direct or indirect method. By oblique illumination greenish-blue dots are seen in the lens. These cataracts generally appear early in life, interfere little with vision and progress slowly. The author's two patients were aged forty and twenty-eight. Their vision was so bad that operation was indicated.

Congenital Anomalies of the Eye.

Ida C. Mann (*The Lancet*, April 14, 1923) describes several congenital anomalies of the eyes that might be mistaken for serious acquired conditions by the unwary practitioner. Pseudo-optic neuritis is always associated with hypermetropia, the swelling is more apparent than real and there are no hæmorrhages or exudates. It should not be mistaken for papilloedema. There is a deep irregular cupping of the optic nerves with the vessels emerging round the periphery common in most of the carnivora. This should not be mistaken for a glaucoma cup where the vessels can be seen in the bottom of the cup before passing over the edge. Persistent hyaloid remnants on the back of the lens are distinguished from glaucoma by the normal depth of the anterior chamber. Undue importance must not be given to the appearance of opaque nerve fibres, a congenital coloboma of the chorioid or the presence of a chorioidovaginal or posterior vortex vein simulating a hæmorrhage. Observers must recognize the congenital nature of polycoria and persistent pupillary membrane and must not be led astray by a congenital ptosis or a congenital unilateral exophthalmos which may mean only a high refractive difference between the two eyes.

Ætiology of Pseudo-Glioma.

L. Gourfein-Welt (*Revue Générale d'Ophtalmologie*, February, 1923) describes the case of a healthy child of five years just recovering from whooping cough who complained of blindness in the left eye. Behind the lens could be seen a white grey mass with blood vessels. The eye was enucleated on the chance that a glioma was present. Examination of the specimen revealed a detached retina with new tissue and vessel formation and behind it a mass of modified blood clot

Sub-Conjunctival Extraction of Cataract.

C. Killick (*The British Journal of Ophthalmology*, July, 1923) reports the results in one hundred cataract extractions performed under a conjunctival bridge. As soon as the knife has completed the section, it is turned backward and made to glide beneath the conjunctiva for about six millimetres or as far as possible. The bridge measures on the average four to five millimetres. If iridectomy is done it is situated laterally, preferably on the inner side for the right eyes and on the outer for the left eye. Simple extraction was performed in fifteen patients with one iris prolapse. The expulsion of the lens is not difficult; only in four instances had the bridge to be divided. A binocular dressing is usually applied, but many patients do perfectly well with a single pad. They walk back to bed except when simple extraction has been performed and get up on the third day. The method is not a definite safeguard against infection as two eyes developed panophthalmitis. No loss of vitreous occurred in the series and this is a distinct advantage of this method.

Optic Atrophy and Herpes Ophthalmicus.

L. Paton (*Proceedings of the Royal Society of Medicine*, July, 1923) describes the history of a woman of sixty-seven who had suffered from a bad attack of ophthalmic herpes affecting all the branches of the first division of the fifth nerve on the left side. On recovery, the vision of the left eye was gone. Ophthalmoscope examination revealed an opaque white

disc. Optic neuritis as a complication of ophthalmic herpes is rare. The author saw a similar condition last year in a woman of thirty-five years. Hutchinson described the condition in 1866 and noted that the globe was not affected except when the naso-ciliary branch of the first division of the fifth nerve was involved. Other observers have recorded instances. Evidence of other cranial nerve involvements is more frequently found, such as diplopia, miosis and seventh nerve paralysis.

LARYNGOLOGY AND OTOLOGY.

Septic Sinus Thrombosis.

WILLIAM MILLIGAN (*The Journal of Laryngology and Otology*, January, 1923) states that septic sinus thrombosis which generally occurs in adult life, must be distinguished from typhoid fever, broncho-pneumonia and malaria. When of otitic origin the streptococcus is the causal organism, but the ever-varying anatomical structure of the temporal bone and the relation of the sinus to the mastoid cells are of importance in the incidence of the disease. In typical and advanced conditions there are found the remittent type of temperature, rigors, profound asthenia, localized pain over the sinus, over the posterior triangle and along the course of the jugular veins at times accompanied by torticollis and enlarged cervical glands. The atypical and latent forms present diagnostic difficulties. They occur more often in children than in adults and are often due to deficiencies in the tympanic floor or to its extreme thinness. Thrombosis secondary to acute septic *otitis media* is less dangerous than when secondary to chronic *otitis media*. In middle ear suppuration when reasonable drainage exists, the occurrence of a rigor should excite suspicion. Also the continuance of a high temperature for several days after a mastoid operation is suspicious. The temperature record is a most important and reliable diagnostic sign. An almost continuous record should be kept or at least a two-hourly record. Sudden oscillations of more than one and a half degrees are unusual in uncomplicated suppurative mastoiditis, but frequent oscillations of from one to three degrees are quite common in commencing peri- or endophlebitic thrombosis. In children the temperature has a tendency to be high continuously rather than remittent. Rigors occur in only about half the patients, in children they are frequently absent throughout the whole course of the disease. Rigors and a feeling of chilliness are very important and occur in 80%. Frequent inspection of the hands, feet and knee caps should be made as they are often found cold when the temperature is quite high. The retinal veins should be daily examined. Ocular changes occur in 75% of sinus conditions. In commencing cavernous sinus thrombosis there are found high and remittent temperature, meningeal irritation and early exophthalmos. When reasonable doubt exists as to the presence of sinus thrombosis the author recommends an exploratory operation for diagnostic purposes.

Deafness Complicating Mumps.

MINOKICHI KUROSU (*The Sei-I-Kwai Medical Journal*, February, 1923) states that the complications of mumps affecting the ear, though infrequent, may have serious consequences. The causal agent of mumps is still unknown. Disturbances of audition always occur suddenly, usually within twenty-four hours of the onset of swelling over the parotid and lead generally to permanent deafness. The incidence is usually unilateral; deafness is often complete, but may be partial. The prognosis is regarded by the author as being better than is usually supposed. The deafness is often accompanied by tinnitus, vertigo, nausea or vomiting and these in twelve of the author's patients occurred simultaneously with the beginning of the deafness. Tinnitus may precede deafness, its duration is variable, it usually disappears with the other symptoms, but may persist for years. Vertigo, nausea and vomiting often occur together at the commencement of deafness and keep the patient in bed for several days. In the author's patients vertigo and vomiting preceded the deafness. The otoscopic appearances are normal. The author agrees with Knapp that, although the occurrence of deafness after mumps is rare, probably many mild forms are overlooked. He also agrees with Dreyfus that many instances of unilateral deafness of unknown origin have really originated from a former parotitis. He advises that all medical practitioners, especially school officers, should make a thorough functional examination of the ears of every child with mumps. Deafness in mumps may arise in two ways. The principal cause seems to be a neuritis set up by a toxin produced by the agent causing the parotitis. More rarely, meningitis may be the cause of the deafness.

Apparatus for Testing Hearing.

SOMERVILLE HASTINGS AND W. L. TUCKER (*The Proceedings of the Royal Society of Medicine*, January, 1923) have devised an apparatus for testing the acuity of hearing which depends on the following principles. A wireless valve can be made to give out vibrations of any frequency, the current from the valve passes to a telephone, by means of a Wheatstone's bridge resistances are interposed until the sounds are no longer heard. The advantages claimed are that the test is but little affected by slight extraneous sounds, that a pure sound of any frequency and intensity can be obtained and that the amount of energy set free by it can be determined. The following considerations determine the form of the apparatus: (i.) The sound should be a pure musical note from whatever part of the scale the ear has to be tested. (ii.) It must be reproducible as regards pitch and intensity from day to day. (iii.) There must be a logical scale of intensity. (iv.) The signals conveyed to the ear must be intermittent at will and some indication of the listener other than oral must be such that no sound interferes with the process of listening. (v.) The sound should be produced so close to the ear that the intensity of the sound cannot be affected by reflections in the room. (vi.) Outside disturbing sounds should be eliminated. (vii.) The process of finding the limit of acuity should be a rapid one to prevent the subject educating himself too well to the operation of listening or from losing acuity from fatigue as the result of concentrated effort.

Zygomatic Mastoiditis.

W. M. MOLLISON (*Journal of Laryngology and Otology*, November, 1922) describes a far from rare form of mastoiditis which spreads forward, presenting a swelling in front of and above the ear and involving the temporal fossa. The swelling may be so far forward as to appear unconnected with the ear. It may be extensive. There may be pain and difficulty in opening the mouth, with tenderness over the root of the zygoma and often over the mastoid process. Otorrhœa is generally present. Deafness is always present and is a valuable sign in the absence of otorrhœa. It is found that in such conditions the zygomatic cells were unusually developed. In the absence of cells infection of diploë is sufficient to account for the disease spreading forwards and leading to the formation of a sub-periosteal abscess. All patients with zygomatic mastoiditis do not develope abscesses. In some instances temporal abscesses may be separated from the point of sepsis in the bone by apparently healthy tissue and in these infection probably spreads by the blood vessels. Operation should include exploration of the outer attic wall, to exclude extension forward of the disease. There is some tendency to stenosis of the meatus after operation.

Boiler-makers' Deafness.

BOILER-MAKERS, working for long periods in an appalling din, with insufficient intervals of rest for the tired auditory organ to recover, frequently become deaf though they can usually hear comparatively well in the clash and crash of the shops. In these individuals the ability to hear voice and whisper as investigated by Richard Lake (*The Journal of Pharyngology and Otology*, June, 1923) is much diminished. Rinné test with c (128 d.v.) yields a positive result and bone conduction is reduced to one-third or less than normal—a totally different picture to that of progressive middle-ear deafness or otosclerosis. Probably the end organ of the auditory nerve is first irritated by the excessive noise and then gradually injured, eventually beyond repair. The author suggests that workers in noisy metal workers' shops should wear sound deadeners. He prefers "Aurotectors" for the purpose.

British Medical Association News.

SCIENTIFIC.

A meeting of the New South Wales Branch of the British Medical Association was held at the B.M.A. Building, 30 to 34, Elizabeth Street, Sydney, on July 27, 1923, Dr. C. H. E. Lawes, the President, in the chair.

The Treatment of Flaccid Paralysis.

Dr. N. D. Royle read a paper entitled "Experimental and Clinical Observations on the Treatment of Flaccid Paralysis" and illustrated his remarks by means of lantern slides, anatomical specimens and apparatus (see page 351). He gave a demonstration of the fibrillation of denervated muscle in anæsthetized rabbits.

Dr. D. J. Glissan congratulated Dr. Royle on his paper which was obviously the result of much careful thought and effort. He had put his subject on a scientific basis in correlating experimental evidence with known clinical facts. There were still many difficulties to be overcome in dealing with this matter. In turning to the conclusions that Dr. Royle had enunciated, he, the speaker, was in the main in agreement. He was whole-heartedly with him in his opinion concerning the value of electrical treatment of paralysed muscles. He could not claim to have based his own opinion in this matter on any experimental evidence, but he had never been able to accept the view that electrical stimulation would aid the recovery of a paralysed muscle, even when applied with all skill, and it had to be remembered that in many cases this form of treatment was applied by persons who possessed little or no understanding of the pathology of the damaged muscle they were called upon to treat. The electrical stimulation of paralysed muscle in such cases was on all fours with flogging a tired horse.

Dr. Glissan said that much more information was required with regard to the action of muscles in health. The physiological processes that accompanied the movement of a joint, were very complicated and could only be conjectured. Dr. Glissan was not prepared to attach as much importance to the question of varying degrees of relaxation of paralysed muscle as Dr. Royle did. From the practical point of view he was inclined to regard this as a refinement. He had not been able to detect much difference clinically as a result of varying the degree of relaxation. Within certain limits he was inclined to place the paralysed muscle in the position of maximum relaxation. He had not had any great difficulty with shortening of recovering muscles. He had noticed in the treatment of certain fractures of the surgical neck of the humerus in abduction that the limb returned readily to the side of the body on removal of the abduction apparatus, since gravity came to the aid of the adductors in overcoming any shortening of the abductor group. The same factor operated in many cases in overcoming shortening of recovering muscles. The main clinical principle to be kept in mind was the necessity of preventing overstretching of paralysed muscles. This should be widely known and practised and it should no longer be possible to find cases of flaccid paralysis at large with their damaged muscles left unprotected and constantly overstretched.

Professor J. I. Hunter endorsed Dr. Glissan's remarks concerning the amount of experimental work that Dr. Royle had carried out during the course of the last three years. Dr. Royle had applied the principles of general physiology to the special instance of flaccid paralysis. He stated that a paralysed muscle could not possess tone. This was undeniably correct. Professor Hunter referred to the work of Sherrington on the proprio-ceptive reflex mechanism. Tone depended on passage of afferent impulses to the central nervous system and back to the muscle and was excluded when the reflex mechanism was defective. The introduction of an impulse to a muscle which was not receiving its proper innervation, could not cause the same response as that applied to a muscle possessed of its nerve supply. Professor Hunter proceeded to discuss the effect of active movement on the physiological activity of muscle and on its growth. Langley's work at Cambridge had been of great importance in demonstrating that denervated muscle was not inactive but in a condition of fibrillation. Dr. Royle had also referred to the experimental work of Ingvar on the effect of electrical stimulation of tissue cultures. In this connexion he wished to call attention in the first place to the work of Ariëns Kappers on neurobiotaxis. A summary of this work had been published editorially in The Medical Journal of Australia of January 22, 1921. On phylogenetic grounds Kappers had shown that the cells of the motor nuclei tended to grow toward the source of stimuli. The nerve impulse was practically an electrical discharge. In the neighbourhood of the growing nerve cell an electric field was set up and in this electric field, according to Kapper's hypothesis, the axis cylinder grew in the direction of the anode, while dendrites grew away from it. Since the current emanating from the protoplasmic projections from the surface of the cell on which stimuli fell, passed in varying directions, the dendrites became multiple and grew in many directions. The work of Kappers had been challenged by C. M. Child, of Chicago, but the facts on which Kapper's theory had been built up, were indubitable. Bok had shown that growth of the axones of a set of cells took place at right angles to the direction of conduction of the nervous impulse stimulating these cells. Kappers had demonstrated that the nerve cell actually moved during the course of development toward the focus whence the stimuli affecting it emanated. These studies were of great interest and importance both from a phylogenetic and from an ontogenetic point of view.

Professor Hunter next turned to the work of Sven Ingvar. He had produced experimental evidence of fundamental importance. Minute galvanic currents acting on tissue cultures of the nervous system induced a definite change in the cells. Ingvar's work seemed to confirm Kapper's contentions. The cell and fibre outgrowths in these cultures occurred almost entirely along the lines of force in the galvanic field. With this movement morphological changes had been observed. It thus appeared that electric forces played a considerable rôle in morphogenesis. But these phenomena were of a different type to those it was hoped to induce by electrical stimulation on flaccid paralysis. The strength of the current used by Ingvar, for instance, was only 1/250,000 milliampères.

Before concluding Profesosr Hunter spoke of the futility of holding beliefs without taking steps to test the truth of these conditions. When Widal was delivering one of the exchange lectures in London, Almroth Wright had pointed out that there was a failure on the part of the clinician to go to the laboratory. It was essential to subject clinical teaching to experimental test. The experimental method was coming to the fore and, unfortunately, morphological study was suffering to some extent. This was unnecessary as the two studies should go hand in hand. Dr. Royle had shown them that evening the importance of a thorough investigation of a clinical problem.

Professor A. E. Mills thanked Dr. Royle for his admirable lecture. He did not quite follow him in his remarks concerning the contraction that resulted when a muscle was paralysed and he asked Dr. Royle to state more fully his views concerning this subject. With regard to tonus and especially to plastic tonus of muscles, as far as he understood the matter from Sherrington and Bayliss's teaching, the muscle fibres retained their length and contraction as the result of reflex innervation beginning in the nerves of the muscles themselves. It was essentially an expression of the activity of proprio-ceptive reflexes. One of the best examples of plastic tonus was exhibited by an animal such as the mollusc pecten whose shell was kept tightly closed by the adductor muscles, but with force the two segments of the shell could be separated. If this were done and the segments of the shell opened, say, six millimetres, owing to the plastic tonus of the adductor muscles the segments remained in this condition; if separated a little further the segments would remain in the altered condition and so on. On the other hand if the segments of the shell were opened and after a little

time closed again, the same difficulty would be experienced in opening the shell a second time as was experienced originally. A similar condition was met with in the bladder and in the stomach and indeed in all hollow viscera. The bladder was full and the tension exerted upon its contents under normal conditions was the same whether that organ contained fifty or one hundred or two hundred centimetres of urine and the maintenance of the same tension under varying conditions was due to that quality of plastic tonus which was such an essential characteristic of muscle activity.

Many of the conclusions to which Dr. Royle had stated he had come, he admitted were opposed to opinions generally accepted. The evidence that Dr. Royle had brought forward had shown the fallacies of some of the old beliefs. His confirmation of Langley's conclusions, based upon direct observation, concerning fibrillation of denervated muscle was very important. Langley had put forward the view that a denervated muscle did not waste because of disease, but because it was in a constant state of activity as shown by the incessant fibrillation, of which a most excellent demonstration had been given that evening. While it was impossible at present to determine the exact mechanism of this fibrillation, it might be looked upon as evidence of some intrinsic function of the muscle itself, freed from its nervous control. It was not a passive or "negative" phase, but an active and positive one and as such must be looked upon as the result of some force or function released, but previously controlled or inhibited.

With regard to the recovery of a temporarily paralysed muscle Dr. Royle had brought forward evidence showing that by early use of the muscle, as soon as some functional power was present, the muscle regained greater power if exercised in the normal way. Professor Mills held that this recovery was, in part at any rate, due to those proprio-ceptive influences which, beginning in the muscles themselves, ascended by afferent paths to higher centres and especially the head centre, the cerebellum and thence downwards to the muscles themselves. By these reflex paths characteristic tonus of the muscle was maintained and this was a factor in the regeneration of the power of the muscle.

Referring to the question of polio-myelitis which had been mentioned that evening, Professor Mills said that pressure on the anterior horns was responsible for many of the symptoms. It must always be borne in mind that œdema followed inflammatory processes and was indeed one of the expressions of the reaction of the tissues to injury. In the case of inflammation of the central horn cells such as occurred in polio-myelitis, œdematous fluid was poured out and this in itself led to pressure upon these cells and interfered with their activity. When this œdematous fluid was removed, many of the cells regained their function, as was evidenced by the return of function of part or the whole of the muscle.

Mr. R. Gordon Craig attacked the problem from an economic point of view. Dr. Royle had shown them in the clearest manner possible that massage and electricity were of very small curative value in the treatment of the flaccid paralyses. What a waste of money there had been during the war in applying these forms of treatment after nerve injuries followed by paralysis! The amount probably exceeded the total sum collected in both the Federal and State income taxes over a long series of years. In his experience patients who could not afford massage, had recovered as rapidly as those whose financial position sufficed for these therapeutic frills of massage and electricity. This was particularly true of Bell's facial palsy. All this treatment effected was to stimulate the patient to make active movements. He congratulated Dr. Royle.

Dr. C. H. E. Lawes, before calling on Dr. Royle to reply, added his thanks and said that from the standpoint of a general practitioner the most important feature of the paper was that part in which electrical treatment was analyzed. This had been almost a fetish for many years.

Dr. Royle explained that the first part of his research had been carried out in Dr. Tebbutt's department at the Royal Prince Alfred Hospital, while later he had worked in the Anatomy Department of the University under Dr. Maguire and then under Professor Hunter. He wished to take the opportunity of thanking them all for their assistance and stimulation. He also wished to acknowledge his indebtedness to his assistants Miss Betts and Mr. Jamieson who had helped him very greatly. In reply to Dr. Glissan he contended that fracture of the neck of the humerus was not quite analogous to flaccid paralysis. The difficulty was that in the presence of a fracture the necessary elongation of the adducting muscles could not be carried out. When constant supervision could not be exercised, he used greater abduction. Dr. Glissan's statement that he could see but little difference as a result of varying the degree of abduction in actual practice was open to criticism in that he had no controls with which to compare his results.

In reply to Professor Mills he stated that he did not know what caused fibrillation. Plastic tonus disappeared in a denervated muscle and therefore did not influence contracture in denervated muscles. The case of the bivalve was not parallel. The muscles were fully innervated in the experiment. Plastic tonus could govern the position in catatonia, but not in denervated muscles. It was well known that fibrous tissue of muscles did contract to accommodate itself to the altered ranges of movement. He explained that the normal elasticity of fibrous tissue permitted the change of length of muscles up to a certain degree. Loss of suppleness meant that the fibrous tissue was less long, that the ligaments had contracted and that the fibrous tissue was less elastic.

Medical Societies.

THE SYDNEY HOSPITAL CLINICAL SOCIETY.

The first meeting of The Sydney Hospital Clinical Society was held in the lecture hall at Sydney Hospital on May 17, 1923. The following office-bearers were elected:

President: Dr. T. Fiaschi, D.S.O.

Vice-President: Dr. Sydney Jamieson.

Committee: Dr. J. Macdonald Gill, Dr. George Bell, O.B.E., Dr. A. W. Holmes à Court.

Honorary Secretary: Dr. George Willcocks, M.C., O.B.E.

Deformity of the Head and Optic Atrophy.

Dr. A. W. Holmes à Court showed a male child, aged four and a half years, exhibiting a peculiar deformity of the head associated with optic atrophy. The child had been apparently normal until the age of three years. About that time the eyesight had begun to fail and the child had suffered from headache. The family history had contained nothing of importance. The Wassermann test applied to the blood and cerebro-spinal fluid of the child and the blood of the mother had failed to yield a reaction. Nothing had been revealed as a result of radiographic examination of the skull. Dr. Holmes à Court pointed out that the intelligence of the child was below normal and that the sight was definitely impaired. The skull was of the elongated dolico-cephalic type. He said that in view of the results obtained by the Wassermann test and the failure to effect improvement by means of vigorous anti-syphilitic treatment, it had been suggested that the diagnosis rested between oxycephaly, lead encephalopathy and cerebral tumour. No evidence of lead absorption had been detected on examination of the urine.

The patient was examined by several members of the staff and the diagnosis was discussed. The shape of the head being inconsistent with the condition described as oxycephaly, the consensus of opinion was in favour of cerebral or cerebellar tumour.

Intra-Cranial Formation of New Bone.

Dr. Holmes à Court also showed a woman, aged thirty-eight years, and a skiagram of her skull in which the intra-cranial formation of new bone was revealed. The

patient had suffered from persistent frontal headache of a boring character and worse at night for a period of three to four years. Dr. Holmes à Court pointed out that the conformation of the face and the general appearance suggested the presence of congenital syphilis. The Wassermann test applied to the cerebro-spinal fluid had yielded a reaction described as "partially positive," but the symptoms had been unrelieved by persistent anti-syphilitic treatment. The radiographic picture showed a "heaped up" formation of new bone on the inner table of the skull and gave a "cumulous cloud" effect. The usual radiographic appearance of rarefaction and proliferation seen in cranio-tabes was absent. The opinion was generally expressed that an operation for trephining over the dense bony area was justifiable in view of the severity and intractable nature of the symptoms.

Tetanus.

Dr. George Bell, O.B.E., showed a girl who had recovered from tetanus. The notes of this patient's clinical history were published in the issue of this journal on August 4, 1923, page 120.

Hydatid Cyst of the Kidney.

Dr. Archie Aspinall showed a specimen of hydatid cyst of the kidney. Nephrectomy had been performed by the lumbar route. The patient, a girl of fourteen years of age, had always lived in Sydney. She had given a history of pain in the left loin with vomiting and frequency of micturition for the previous twelve months, but had not suffered much inconvenience otherwise. A large mass present in the left hypochondrium had felt like a cystic tumour. Dr. Bridge had performed cystoscopy and had found a double ureter on the left side. A pyelogram had revealed the presence of two separated ureters, one at the upper and one at the lower pole of the kidney. The urine had contained red cells and few pus cells. All the ureters had been functionating and the results of the tests for renal function had been normal. The blood had contained 3% eosinophile cells. The diagnosis had rested between cystic kidney, malignant growth, horse-shoe kidney and hydatid disease. The tumour had been difficult to remove and had been looked on as a cystic kidney. Examination after removal had shown the presence of a large hydatid cyst with daughter cysts occupying mainly the region of the pelvis of the kidney. The patient had made an uninterrupted recovery and Dr. Aspinall was of the opinion that it would not have been possible to have drained the kidney satisfactorily and that nephrectomy in the circumstances had been the best course to adopt.

Severed Tendon.

Dr. R. H. Bridge showed a man, aged twenty-five years, an iron dresser, whose hand had been caught in an emery wheel on January 1, 1923. The wound on the dorsum of the hand had been dirty and the severed ends of the *extensor pollicis longus* tendons had been visible. The tendon had been sutured immediately and the wound cleaned. Owing to its septic character the wound had broken down and the ends of the tendon had broken away. The result had been permanent flexion of the distal phalanx of the thumb. The patient had been readmitted to hospital on March 23, 1923 and the old wound had been opened up. It had been found that the interval between the two ends of the severed tendon was considerable and that the proximal end was bound up in scar tissue. Dr. Bridge had then decided to suture the distal end to the tendon of the *extensor pollicis brevis* by splitting the former and lacing it round the latter. The finger had been splinted in an extended position and the patient had made an uninterrupted recovery. At the time of demonstration the patient was back at work and was able to extend his terminal phalanx almost as well as before the accident. Dr. Bridge pointed out that before the last accident the patient had, owing to the nature of the injury, been left with a permanently flexed thumb nad had been quite unable to follow his usual occupation.

Multiple Aneurysms.

Dr. L. W. Dunlop showed a woman, aged forty-five years, a widow, who had been admitted to hospital on May 14, 1923. She had complained of a swelling in the neck, of breathlessness and giddiness and of coughing up blood-stained expectoration. She had also complained of a pain in the back shooting round towards the left nipple. She had given a history of having had measles and influenza and had denied any infection by venereal disease. She had given no history of miscarriages, but had admitted to a certain amount of *potus*. She had had one child who had died at the age of ten years from dropsy. The patient's father had died of heart failure and her mother of a "stroke." A brother had also died of heart failure. Examination on admission to hospital had revealed a stout woman with a congested appearance. In the neck there had been two swellings with expansile pulsation. The smaller swelling had been situated on the left side of the neck in the course of the common carotid artery near the bifurcation. A larger swelling had been situated on the right side and had bulged into the neck from behind and above the right sterno-clavicular joint. There had also been present a diffuse and heaving præcordial pulsation and the apex beat had been displaced outwards. No thrills had been palpable, but a heaving and forcible apex beat had been noted. There had been no diastolic shock. Abnormal dulness had been present over the aortic arch and to the right of the sternum. The first sound at the apex had been impure and the second sound at the aortic area had had a definite ringing quality. The pulsation in the radial vessels had been equal and synchronous. No tracheal tug had been present and no inequality of the pupils nor involvement of the larynx. A "partially positive" response had been obtained in the blood serum to the Wassermann test. Radiographic examination had revealed an enlarged heart shadow with definite dilatation of the aortic arch to twice its normal calibre. Dr. Dunlop said that the condition was obviously one of multiple aneurysm due no doubt to a specific vascular change affecting mainly the aortic arch and the common carotid on the left side. The hæmoptysis which was occurring occasionally, was probably due to pressure on the trachea by the larger aneurysm. Dr. Dunlop raised the question as to whether "Salvarsan" should be given in small doses or at all. Dr. Sydney Jamieson, Dr. Macdonald Gill and others were unanimous in their opposition to the use of "Salvarsan." In its stead Tufnell's diet and the administration of iodides and mercury were recommended. Dr. Dunlop concurred in this and referred to the writings of many American authors who had recorded the occurrence of serious symptoms after the administration of quite moderate doses of "Salvarsan" in cardio-vascular syphilis.

Foreign Bodies in the Œsophagus.

Dr. H. Seaward Marsh showed two foreign bodies which he had removed from the œsophagus. One of these was part of the bone of a duck and the other was a safety pin which had been swallowed open. Dr. Marsh described the method of removal in each instance.

Skiagrams.

Drs. J. G. and W. A. Edwards showed a number of interesting skiagrams.

THE MELBOURNE PÆDIATRIC SOCIETY.

A meeting of the Melbourne Pædiatric Society was held at the Children's Hospital, Carlton, on June 13, 1923, Dr. Rupert M. Downes, C.M.G., the President, in the chair.

Epispadias in a Female.

Mr. W. Dismore Upjohn, O.B.E., presented a female baby, aged eleven months, which had come under his notice on account of inversion of the bladder. The urethra had been so relaxed that after replacement of the bladder he had been able to introduce a finger and perform vesicopexy by means of the insertion of sutures through the abdominal wall. It had been apparent that the bladder could not be distended on account of the state of the urethra and that inversion would rapidly occur after reduction. Because of these facts he had regarded the above procedure as essential.

Chronic Osteitis.

Mr. Upjohn's second and third patients were regarded to be suffering from two phases of the one condition. The second patient, a boy, aged four years and six months, had originally had an osteitis of the *os calcis* and at the time had complained of some pain in the left forearm; on this account a skiagram had been prepared which did not show any lesion of the ulna. Some weeks later it had been noticed that the same forearm though not painful was considerably enlarged and skiagraphy at this stage had shown the enlargement to be due to a gross degree of osteitis without any evidence of sequestrum formation or tendency to sinus formation. In the same period the disease of the *os calcis* had progressed and an amount of bone had died. This had been sufficiently large to act as a foreign body with resultant sinus formation and would require operation. He considered that syphilis could be excluded as an ætiological factor in this patient's condition. The third patient was a girl, aged thirteen years, who had had a febrile illness four years previously. During this illness she had suffered pain at the distal extremity of her right femur; this had gradually diminished in severity and for a considerable time had been elicited only occasionally and then after traumata. In the meantime the lower third of the femur had become enlarged more or less uniformly and skiagraphic appearances had not indicated anything other than a chronic inflammatory process without sequestrum formation. At the time of demonstration there was not any indication for operation, Mr. Upjohn recalled another somewhat parallel example which had eventually become so painful that it had become necessary to drill the bone. He did not see that there was any necessity to postulate a syphilitic basis for these conditions, for similar bones had been found which were prehistoric and wild animals were also sometimes affected.

Fractured Clavicle.

Mr. Upjohn's fourth patient, a boy, aged thirteen years, had fractured his right clavicle at the junction of medial and middle thirds and was presented to demonstrate the unusual amount of upward displacement of the medial fragment.

Talipes.

MR. W. KENT HUGHES presented a young adult male patient upon whose foot he had operated with the object of improving the extreme degree of *talipes equinus* which had followed polio-myelitis in childhood. Correction of the fall of the foot at the mid-tarsal articulation had been effected by dividing the long and short plantar ligaments, the deep plantar fascia and all its prolongations to the tarsal ligaments. The stability of the foot so obtained was demonstrated.

Cyst of the Capsule of Tenon.

Mr. W. Kent Hughes's second patient was a girl, aged eleven years, who had had considerable proptosis of the right eye. At operation a collection of foul glairy fluid had been evacuated from the capsule of Tenon. Repeated attempts had been made to culture organisms from the fluid without success and, as it had not been possible to establish the presence of organisms by microscopical methods he concluded that the cyst was a sterile one. The eye was still somewhat proptosed, but the ocular muscles were all functionating. Mr. Kent Hughes said that the condition was mentioned by Parsons as a very rare one.

Epidermolysis Bullosa.

DR. A. P. DERHAM presented a girl, aged eight years and four months, suffering from *epidermolysis bullosa*. Owing to the tendency of the slightest trauma to produce bullous lesions and the general atrophic state of her skin her condition at intervals was pitiable, but he thought that improvement could be attributed to the regular use of thyreoid extract combined with anti-specific treatment, though he recognized the intractable nature of the disease.

Congenital Myatonia (Oppenheim).

Dr. Derham's second patient, a girl, aged two years and four months, he thought, was affected with a rare condition described by Oppenheim in 1900 under the title myatonia. Remarkable flaccidity had been noted during the first few weeks of life, breathing had been almost entirely abdominal, general muscular amylotonia had persisted until six months previously, and her skin was of a waxen pallor. However, it was definitely known that she was a congenital syphilitic subject and her dietary had consisted of patent foods. Six months previously fresh milk and accessory food factors had been incorporated in the dietary and anti-specific inunctions instituted. In addition, thyreoid extract was being exhibited and the child was able to use her hands a little and her skin was a healthier colour.

In the discussion that ensued the consensus of opinion was that in this instance the underlying deficiency of anterior horn cells was more likely to be ascribed to syphilis than to a congenital anomaly.

Differential Diagnosis of Polio-Myelitis.

DR. LIONEL HOOD presented a girl, aged two years, who on being awakened one morning had been unable to stand. Previously, except for a slight cough and impetigo, she had been in good health. A feverish illness had followed the main features of which were her disinclination to walk and her irritability when she was disturbed. However, neurological examination had failed to indicate any abnormality and as the condition had progressed it had become apparent that a suppurative process was operating in the neighbourhood of the right sacro-iliac synchondrosis and surgical treatment was about to be instituted.

Osteitis of the Patella.

DR. F. KINGSLEY NORRIS showed a boy, aged eleven years, who had suffered from intermittent pain in the right knee for the previous four years. This had been accompanied by wasting of the right lower limb. Skiagraphy revealed the presence of a focus of disease in the patella.

Twisted Gangrenous Ovary in a Hernial Sac.

DR. NORRIS exhibited a pathological specimen as a sequel to a discussion at a previous meeting on the probable nature of a labial tumour present in a baby, aged six months. The swelling had been caused by an ovary in a hernial sac. The ovary had become gangrenous as a result of torsion by the time it was removed.

THE MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA.

A MEETING OF THE MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA was held at the University of Adelaide on July 6, 1923.

Hæmaturia in Cattle.

DR. L. B. BULL exhibited a specimen of a bladder of a cow which had been sent to the Stock Department by a stock owner in the south-eastern district of South Australia because it was suffering from hæmaturia. The lesions characteristic of this disease in cows were present in an extreme degree in the specimen. He stated that the disease occurred in the district from which the specimen had come, in the Illawarra district in New South Wales, in Canada and in Germany. The ætiology of the disease was unknown. It was characterized by hyperplasia of the epithelium of the bladder with epitheliomatous changes. There was an angiomatous reaction of the blood vessels; this was responsible for the bleeding which resulted in the hæmaturia.

PROFESSOR J. B. CLELAND stated that he had met with this disease in specimens sent to him from the south coast of New South Wales. The disease occurred in cows pastured on the hills just behind the flats bordering on the coast. It differed entirely from the disease known as "red water" in that the urine contained not merely hæmoglobin, but also erythrocytes and sometimes large clots of blood were found in the urine. In the early stages small angiomata formed on the inner surface of the bladder. Then papillomata grew on these which increased in size.

At times they passed into definite carcinomatous growths. The extraordinary restriction of the areas in which this disease was endemic, suggested that the animals were poisoned by some plant or mineral co-extensive in distribution with the areas in which the disease occurred. It had been difficult to find any plant which occurred in the hills of the Illawarra district in New South Wales, at Mount Gambier in South Australia and also in Canada and Germany. It thus appeared that a plant origin was unlikely. A parasitic origin of the disease was, of course, conceivable; for example, *Bilharzia* gave rise to the same condition in human beings. Many animals afflicted with the disease had been examined very carefully and in some pentastomes had been found in the mesenteric glands, but these could not be held responsible for the condition. Otherwise nothing had been found. Recollecting that aniline dye workers frequently developed carcinoma of the bladder as a result of the excretion of the dye through the kidneys and its lodgement for varying periods in the bladder, the possibility suggested itself of a chemical origin of the disease. The tissue reactions noted in the bladder were similar to those which resulted from the continued action of radio-active material and the possibility might be suggested that radio-active substances were present in the water in these districts and that during the period that the urine remained in the bladder the radio-activity due to the excretion of radio-active minerals sufficed to induce the changes observed. If this were the case, this disease might occur in human beings, if they should drink water derived from the streams in these localities and not rain water. No report, however, of this condition in human beings had been received. In reply to a question by Dr. W. T. Hayward Professor Cleland stated that the disease had so far been recorded only in cattle.

Mr. Marston urged that damage to the kidneys might be expected during the excretion of the radio-active material.

Professor T. Brailsford Robertson pointed out that the time occupied in the passage through the kidney might be very brief in comparison with the time during which the urine was contained in the bladder. Furthermore, the urine in passing through Bowman's capsule was very diluted and by the time the urine reached the bladder it had become concentrated at least sixty times. The observations at aniline dye works quoted by Professor Cleland showed that the bladder could be affected by irritant substances, while the effect on the kidney was still unappreciable.

Dr. W. T. Hayward, C.M.G., asked why, if this were the true explanation of the origin of the disease, it had not occurred in horses pastured in the same localities.

Professor Cleland pointed out that as these were dairying districts, cows were much commoner than horses. The disease did not occur in every animal, but only in occasional animals. For this reason the affection occurring in horses might be expected to be extremely rare.

Dr. A. A. Lendon drew attention to the fact that the effect of cantharides on the bladder was out of proportion to its effect on the kidneys.

The Globulin Content of the Blood in Infections.

Dr. R. Hone gave a résumé of his experiments in connexion with the changes in the proteins of the serum accompanying certain pathological conditions. The conclusions reached were that a rise in the proportion of globulins indicated invasion of the tissues by infective organisms. In nephritis there was usually a high value of globulin. In nephritis caused by lead, however, there was very little alteration of the globulin content of the serum, notwithstanding the fact that albuminuria existed. Nephritis produced in rabbits by arsenic led to very little effect on the globulin ratio. In reply to a question by Dr. Lendon Dr. Hone stated that the analyses of protein of the blood serum had not been correlated with analyses of the globulin and albumin in the urine.

Professor J. B. Cleland inquired whether the rise in the globulin content of blood serum could be caused by infection with protozoa.

Dr. Hone said that the most characteristic rise in the globulin content was encountered in syphilis. He also stated that it had been found that the therapeutic action of arsenical compounds in this disease could be accurately gauged by its action on the globulin content of the blood serum. When the globulin content returned to its normal value, the power of the serum to give rise to a reaction to the Wassermann test disappeared. He had noted a considerable rise in the proportion of globulin in the blood serum of patients suffering from secondary anæmia suspected to be protozoal in origin and associated with a high degree of eosinophilia.

Globulin in Urine.

Dr. A. A. Lendon described a test he had devised for the detection of globulin in urine. It consisted in the addition of dilute acetic acid drop by drop, floated on the top of the column of urine. The formation of a ring of precipitated protein without the application of heat appeared to indicate the presence of globulin. Globulinuria was encountered in persons with high blood pressure and with fever.

Mr. Marston said that a specimen of urine recently sent to the Bio-Chemistry Department for examination had been found to contain 12% of protein, almost the whole of which had been globulin. This fact had been ascertained by subjecting the urine to dialysis in a celloidin sac. The globulin had been held in solution in the urine by the contained salts. On removal of these by dialysis and subsequent filtration the globulin had been removed. The residual protein still in solution might be either albumin or the water-soluble form of globulin. In the majority of samples of albuminous urine little or no globulin could be removed by dialysis and filtration. At times urine contained an admixture of globulin and in a few samples, like the one mentioned, all the protein in the urine was precipitated by dialysis.

Gigantism in Mice.

Professor T. Brailsford Robertson exhibited a group of mice in which gigantism had been induced by the administration of "Tethelin," a lipoidal substance extracted from the anterior lobe of the pituitary body. The period of administration had been limited to eight weeks, between the fifth and the thirteenth weeks of age of the animals. Many observers, including Schafer, Aldrich, Wulzen, Maxwell and Pearl, had shown that continuous administration of the anterior lobe of the pituitary body to animals caused retardation of growth, followed by acceleration which, however, was inadequate to compensate fully for the initial retardation. The net effect was a slight diminution of the adult weight of the animals. These experiments had been repeated by himself and Ray in 1914 and 1916 and the results confirmed. It had been found that the same results ensued if the lipoidal substance obtained from an alcoholic extract of anterior lobe tissue by precipitating with ether (which he had named "Tethelin") was administered in the place of the pituitary tissue. Since this preparation could be administered in doses which could not be given in the form of fresh tissue, the effects obtained were more pronounced.

Professor Robertson said that he had subsequently discovered that the secondary acceleration of growth was diminished by the continued administration of "Tethelin." If the preparation were discontinued at the moment when the initial retardation had reached its maximum, the secondary acceleration was much more pronounced. In these circumstances the acceleration more than compensated for the initial retardation and eventually resulted in veritable gigantism. When four milligrammes of "Tethelin" were given by mouth each day to animals during the period between the fifth and thirteenth weeks of life, the weight of the adult at five hundred days exceeded that of normal animals by six grammes. This represented 25% of the average weight of the control animals. The animals exhibited had been used in a repetition of this experiment. The administration of "Tethelin" had been by the subcutaneous route instead

of by the mouth. This modification had been introduced for the purpose of ascertaining whether or not the same result would be obtained. The six control mice exhibited were females one year of age. Their weight averaged 25.9 grammes, the largest weighing thirty-one grammes and the smallest twenty-three grammes. The treated animals were of the same age and sex. Their average weight was 36.6 grammes, the largest weighing forty-three grammes and the smallest thirty-four grammes. The degree of gigantism was therefore even more pronounced than in the former experiment. The excess of weight in the treated animals was 10.7 grammes or 41% of the weight of the control mice.

Professor Robertson drew attention to the analogy afforded by these experiments to the clinical observations of Marie and Cushing that pre-adolescent hyper-pituitarism resulted in gigantism, while post-adolescent hyper-pituitarism resulted in acromegaly. No clinical explanation of the results of these experiments was suggested, because the doses necessary to elicit generalized effects were impracticably large for employment in human beings. The only clinical application of "Tethelin" suggested by him was a local one for slowly healing superficial wounds or ununited fractures. He stated that a considerable measure of success had attended this method of treatment. The stimulation of healing was similar to that induced by scarlet red. As a rule it was more rapid and more effective.

Congress Notes.

THE AUSTRALASIAN MEDICAL CONGRESS (BRITISH MEDICAL ASSOCIATION).

Hospital Demonstrations.

It is the intention of the Executive Committee of the Australasian Medical Congress (British Medical Association) to arrange matters so that all official hospital demonstrations shall take place in the early mornings and conclude not later than nine o'clock a.m.. This arrangement will enable members of Congress attending hospital demonstrations to reach the University in time for the sectional work at ten o'clock. In order to make this convenient for visiting members arrangements have been made with the managers of Menzies Hotel, The Oriental Hotel, The Hotel Windsor and Scott's Hotel for the provision of early breakfast at 7.30 a.m. on receiving twenty-four hours' notice. The manager of Scott's Hotel is willing to provide breakfast for members unable to obtain early breakfast in their own hotels. Inquiries are also being made at the hospitals as to whether breakfast could be provided at an early hour in these institutions.

Contribution of Papers.

The attention of members intending to contribute papers to Congress is directed to the rule laid down by the Federal Committee of the British Medical Association that a complete typewritten copy of papers shall be in the hands of the Honorary Secretary of the Section not less than thirty days before the date fixed for the Inaugural Meeting of the Congress. Members are thus required to place their papers in the hands of the secretaries of sections not later than October 13, 1923. It is understood that members will keep a copy for themselves.

Accommodation.

Attention of members and intending members is again directed to the necessity for arranging accommodation for themselves during Congress week. Melbourne will be particularly full at the time of Congress and in order to avoid disappointment it will be found necessary to arrange accommodation without delay. The list of available hotels is appended.

Railway Concessions.

Attention is drawn to the finally revised statement of travelling facilities on the railways.

The Railway Commissioners of the Commonwealth and of the Australian States have agreed to concessions as hereunder stated: In accordance with the usual practice, delegates travelling from other States will be issued single tickets for both the forward and return journeys at two-thirds of the single fare, provided that not less than six

House.	Address.	Persons to Accommodate.	Rooms.		Tariff.	
			Double	Single.	Per Day.	Per Wk.
Scott's	Collins Street West, Melbourne	26	6	14	23s.	
Windsor (formerly Grand)	Spring Street, Melbourne	200	—	—	20s.	
Carlyon's	Spencer Street, Melbourne	30	—	—	Single Room, 5s.; Double Rooms, 10s.; Meals as taken	
Union Club	Collins Street West, Melbourne	6	—	—	20s.	
New Treasury	Spring Street, Melbourne	20	—	—	16s.	£4 4s.
Port Phillip	Flinders Street, Melbourne	30	—	—	15s.	
Victoria Coffee Palace	Collins Street East, Melbourne	200	—	—	Single Rooms, 3s. 6d. and 4s. 6d.; Double Rooms, 6s., and 10s.; Meals as taken	
Federal Palace	Collins Street West, Melbourne	200	—	—	11s. 6d. to 20s.	
Cathedral Hotel	Swanston Street, Melbourne	12	—	—	10s. 6d.	£3 3s.
Esplanade (Carlyon's)	Esplanade, St. Kilda	6	—	—	20s.	
George	Fitzroy Street, St. Kilda	40	20	—	15s.	
Ritz	Fitzroy Street, St. Kilda	30	—	—	20s.	
Prince of Wales	Fitzroy Street, St. Kilda	30	15	—	13s. 6d.	
Beaconsfield	Beaconsfield Parade, St. Kilda	25	—	—	15s.	
Inverleigh	12, Acland Street, St. Kilda	11	4	3		
Victoria Hotel	South Melbourne	30	—	—		£5 5s. to £6 6s.
Bridge Hotel	Mordialloc (15 miles by electric train)	14	4	6	12s.	£3 3s.
Hampton Hotel	Hampton (10 miles by electric train)	12	—	—	15s.	£3 3s.
Royal Terminus (Kemp)	Brighton Beach (9 miles)	10–12	—	—		£5 5s.
Beaumaris Hotel	Beaumaris (11 miles by motor to rail in November)	20	—	—	15s.	£4 4s.
Mentone Hotel	Mentone (13 miles by electric train)	20–50	—	—	15s.	£4 4s.

delegates travel from a particular State. The concessions will apply to the wife of a delegate if she accompanies her husband.

The tickets will be issued so as to enable delegates to arrive at their destination not more than three days prior to the commencement of the Congress and to begin the return journey within one month from the date the Congress commences, that is to say, the return journey must begin not later than December 12, 1923. The journey cannot be broken, except for one day in passing through a capital city. Under this arrangement members may arrive from other States on or after Thursday, November 8, 1923.

Victorian country members will be allowed single tickets on both the forward and return journeys at half holiday excursion fares, but no break of journey. They may arrive in Melbourne on or after Thursday, November 8, 1923, and must leave Melbourne not later than Tuesday, November 20, 1923, on the return journey.

The Executive Committee wishes to point out that these concessions are unalterable and that it is useless making any application for individual variations.

Entertainments.

In regard to entertainments the Executive Committee points out that provision has had to be made for a very large number of lady visitors as well as for a certain number of members who make the Congress week to some extent a holiday. The Executive Committee has kept persistently before it the requirements that the scientific work of the Congress must take precedence over all other activities.

The Acting Prime Minister of the Commonwealth, the Honourable Dr. Earle Page, has invited the members of the Congress and their lady friends to a garden party to be given by the Commonwealth Government in the grounds of Federal Parliament House on Thursday, November 15, 1923, at four o'clock p.m.. The Executive Committee has gratefully accepted this invitation. Necessary rearrangements of the scientific and entertainment programmes are being made, but the scientific programme will not be curtailed.

Congress Dinner.

Members of Congress intending to be present at the official Congress dinner on Thursday, November 15, 1923, are requested to notify the Secretary of the Dinner Committee, Dr. B. T. Zwar, 54, Collins Street, Melbourne, of their intention of doing so as soon as possible. They are particularly asked to state the section with whose members they wish to sit. Notification to Dr. Zwar will be of material assistance in enabling him to complete arrangements which will be satisfactory and convenient to members.

Saturday, November 10, 1923.

Evening: Party at No. 9, Darling Street, South Yarra, by the Ladies' Hospitality Committee.

Sunday, November 11, 1923.

Afternoon: Sir James and Lady Barrett will entertain at afternoon tea members of the Sections of Ophthalmology and Otology together with their wives and relatives accompanying them.

Monday, November 12, 1923.

Morning: Arrival of members.

Afternoon: Reception and garden party by the President at the University; opening of the New Anatomy School by Sir William Macewen; unveiling of War Memorial, the Governor and Lady Stradbroke to be present.

Evening: Inaugural meeting at the Town Hall. This meeting will take place at 8.30 o'clock p.m. in order to allow time for private dinners. The Governor-General and Sir William Macewen will be present.

Tuesday, November 13, 1923.

Afternoon: Party at the Botanical Gardens by the Hospitality Committee of the Victoria League of Victoria (three hundred and fifty lady visitors); visit to *Herald* Office (twenty guests) at 3 p.m.; visit to Deaf and Dumb Asylum (twenty-five guests) at 2.30 p.m.; visit to Royal Victorian Institute for the Blind at 2 p.m.; visit to Sunshine Harvester works at 2 p.m.

Evenings Returned medical officers' dinner; theatre party at Princess Theatre.

Wednesday, November 14, 1923.

Afternoon: The Governor-General's garden party.

Evening: Popular lecture by Sir John Macpherson, "The Emotion of Fear in Health and in Disease"; Victorian Medical Women's Society's reception at Wattle Tea Rooms. The War Museum will be open to all visitors.

Thursday, November 15, 1923.

Afternoon: Garden party at Federal Parliament House at 4 p.m.; visit to *Herald* Office (twenty guests) at 3 p.m.; visit to *Sun* Office (twelve guests) at 3 p.m.; visit to Fire Brigade.

Evening: Congress Dinner, the State Governor to be present; reception for ladies at State Government House.

Friday, November 16, 1923.

Afternoon: Visit to Pelaco factory; visit to *Herald* Office (twenty guests) at 3 p.m.; visit to *Sun* Office (twelve guests) at 3 p.m.; visit to Commonwealth Serum Laboratories; visit to National Museum (Mr. Kershaw to conduct the party).

Evening: The Governor-General will entertain the chief officers of Congress at dinner; ball to be given by the Victorian Branch of the British Medical Association in St. Kilda Town Hall.

Saturday, November 17, 1923.

Afternoon: Expedition to the country arranged by the Melbourne Medical Association; visits to O'Shanassy Water Scheme (fourteen guests) and Wallaby Scheme (sixteen guests), visitors to return on Sunday.

Evening: The Mermaid Play Society has offered concessions to the Ladies' Hospitality Committee for this evening.

Sunday, November 18, 1923.

All day excursion to the Quarantine Station at Portsea.

Monday, November 19, 1923.

Excursion to Yalloun under the direction of Sir John Monash (limited to seventy-eight male members from outside Victoria).

Other Arrangements.

Visits to welfare centres will be arranged for each morning. Mr. Nathan will welcome visitors to his grounds and hot houses at Ripponlea at any time. Visitors will be welcome at the Zoological Gardens every afternoon and will be conducted through the gardens by the Director (Mr. Wilkie).

Social Clubs.

Honorary membership will be extended to all male members of Congress by the Yorrick Club, the University Club and the Commercial Travellers' Club.

Honorary membership of the Naval and Military Club will be offered to members who in the ordinary way would be eligible for membership in view of their naval or military service.

Honorary membership of the Lyceum Club will be offered to all women medical practitioners.

Sports Clubs.

Visitors will be welcomed as honorary members of clubs under the following conditions:

Lawn Tennis Association of Victoria: The lawns at St. Kilda will not be available for play, but visitors are invited to make use of the club house and courts at Kooyong.

Golf Clubs: Visitors may play at any time during Congress week at the Metropolitan, Albert Park, Victoria and Riversdale Golf Clubs. Visitors may not use the links of the Yarra Club on Saturday after twelve-thirty p.m., but may do so at other times. The usual green fees will be paid. At the Royal Melbourne Club not more than

twelve visitors may play on each day except on Saturday and Sunday.

Cricket: Visitors will be granted full privileges of membership by the Melbourne Cricket Club.

Bowls: Visitors will be granted full privileges of membership by the Carlton Bowling Club.

Medico-Legal.

CORCORAN *v.* DR. LILIAN COOPER.

At a representative meeting of medical practitioners held in Brisbane recently it was unanimously agreed that members of the medical profession generally be asked to contribute to a fund to help Dr. Lilian Cooper defray the costs of the action which she was recently called upon to defend. Though Dr. Cooper won the case, she has been compelled to meet all her own costs.

The opinion was expressed at the meeting that the honour of the medical profession as a whole had been attacked. At the same time it was felt that the fact of Dr. Cooper having carried the case to a successful issue had established a precedent in actions of this nature. It was, therefore, of considerable moment to every member of the medical profession.

Subscriptions may be sent to the Honorary Treasurer of the fund, Dr. G. W. Macartney, D.S.O., B.M.A. Building, Adelaide Street, Brisbane. It is proposed to close the fund on October 31, 1923.

The following subscriptions have already been received or promised:

Twenty Guineas.—Dr. W. N. Robertson, C.B.E.; Dr. J. O'Neil Mayne.

Ten Guineas.—Dr. E. D. Ahern, Dr. A. H. T. Nesbit, Dr. R. Graham Brown, Dr. H. V. Foxton.

Five Guineas.—Dr. D. A. Cameron, Dr. R. Marshall Allan, M.C., Dr. J. V. Duhig, Dr. W. Crosse, Dr. A. C. F. Halford, Dr. L. J. Spence, M.B.E., Dr. A. V. Meehan, Dr. F. Fage, Dr. J. J. Power, D.S.O., Dr. G. W. Macartney, D.S.O., Dr. W. W. Hoare, Dr. L. P. Winterbotham, Dr. Eustace Russell, Dr. C. A. Thelander, Dr. M. L. McKillop, Professor J. P. Lowson, Dr. J. Lockhart Gibson, Dr. A. H. Marks, C.B.E., D.S.O.; Dr. A. C. Rivett, Dr. V. McDowall, Dr. Morgan Lane, Dr. H. J. Windsor.

Three Guineas.—Dr. C. M. Lilley, Dr. P. J. Kerwin.

Two Guineas.—Dr. A. C. Ward, Dr. E. S. Meyers, Dr. P. J. Kelley, Dr. W. Ryton Kelley, Dr. Eleanor Greenham, Dr. Hedley J. Brown, Dr. E. O. Marks, Dr. J. H. Crawford, Dr. John Hardie, M.C.; Dr. H. Green, Dr. T. H. Morgan, Dr. George Thomson, Dr. F. A. Hope Michōd, Dr. D. Gifford Croll, C.B.E.; Dr. E. Rivett, Dr. C. E. Tucker, Dr. W. A. Fraser, D.S.O.; Dr. C. Mattei, Dr. O. Ellis Murphy, Dr. A. P. Murphy, M.C.; Dr. Neville G. Sutton.

One Guinea.—Dr. J. McKillop, Dr. G. A. Sampson, Dr. K. Barron Fraser.

Special Correspondence.

LONDON LETTER.

By Our Special Correspondent.

Panel Practice.

The London Insurance Committee is pursuing its investigations of certain alleged abuses by panel practitioners of the provisions of the *National Insurances Act*. A committee has inspected the accommodation for waiting patients and with one or two exceptions has found it to be adequate. A complaint for which, in the past at any rate, there has been more real ground, refers to the provision of medical attendance apart from the recognized "surgery hours." This is bound up, of course, with the question of "lock-up surgeries"—a question which only arises in urban industrial areas (in London chiefly in the slums of the East End and south of the Thames). It must, I think, be admitted that until recently a grievance did exist in this connexion among the patients of certain practitioners: the doctor's residence might be several miles from his place of business and for an urgent case of illness during the night there was no alternative but to call in another practitioner. The fee payable was recoverable, if rarely recovered in practice; but valuable time was occasionally lost in this way and disquieting remarks have been made at inquests concerning the difficulty of securing medical attention during the night in the industrial quarters of London.

A non-panel practitioner is, of course, at liberty to reside where he likes and to be absent whenever he wishes from the area of his professional activities; but the panel practitioner has made a contract. He receives payment and in return should be prepared at all times to do the work for which he is paid. The most notable delinquencies occurred during the war, at a time when panel practices were relatively cheap and were sometimes the subject of speculation. The non-resident medical man who bought and ostensibly conducted the practice in certain instances, made imperfect provision for attendance on his patients by assistants who were not always resident on the surgery premises or within reasonably ready telephonic communication. The limitation of individual practitioners' lists and the gradual return to pre-war conditions have certainly effected an improvement, but there are still a few cases for investigation. In pre-panel days it was, of course, easy to explain why in slum areas a number of the practitioners had "lock-up surgeries." Medical attendance was almost entirely paid for in cash; the bond attaching certain families to certain doctors was very weak and the loss in good will from a doctor's inability to attend to a night summons was thus almost negligible. The temptation was strong for the doctor to reside elsewhere and outside his prescribed hours of attendance to enjoy a position of freedom without responsibility. To the urban panel doctor of the present time, treating at high pressure from six to eight or nine at night complaints of which a very large proportion are utterly trivial, the inclination to have a decently situated private residence in which his afternoons and week-ends can be spent in peace, is equally great.

A *modus vivendi* is possible, of course, in a combination of partners and herein seems to lie the only means of solving the problem of the organization in slum urban areas of a panel medical service which shall at once guarantee to the patient adequate and prompt attention in emergencies and to the doctor a reasonable opportunity for relaxation and temporary release from an exacting routine. In one practice with which I am acquainted, five doctors in partnership are responsible for the treatment of ten thousand panel patients. The area is one which is very thickly populated, and four-fifths of the work is conducted at one central surgery, consisting of four small adjoining cottage houses in a subsidiary street just off a main road. The work is divided into "day" and "night," day being from 9.30 a.m. to 9.30 p.m.. Each member of the firm does day work amounting to forty-eight hours a week and sleeps on the premises two nights a week; so that on five nights out of seven the night bell is removed to a pleasing remoteness from him and for a reasonable proportion of day time he is almost as free as the average citizen to enjoy, out of office hours, an undisturbed leisure.

During each individual's absence from the surgery his patients are seen by one of his partners. There is, of course, an occasional discontinuity of observation, but the patients are given record cards (similar to those of hospital outpatients) on which diagnosis, progress and treatment are briefly recorded at each attendance or visit. The insured person has the compensating advantage that he receives automatically from time to time a second medical opinion concerning his case. In practice the partners find that the assured leisure they gain from this mode of organization, more than compensates for the strenuous and con-

tinuous character of the clinical work done during the hours of duty; two doctors are responsible for the morning and three for the evening consultations each day and the visiting is done by three each day. Three consulting rooms and an operating room are found to be necessary; the upper portions of the premises are adapted for residential purposes. The secretarial and dispensing work and the door-keeping and receptional duties are divided between nurse-dispensers working on a shift system not unlike that which regulates the working of the partners.

Obituary.

CHARLES CECIL HUMPHRIES.

WE regret to record the death of Dr. Charles Cecil Humphries which occurred at the Prince of Wales Hospital, Randwick, on September 17, 1923.

EDWIN JEFFREY BIRD.

THE announcement of the death of Dr. Edwin Jeffrey Bird which took place at Northcote, Victoria, on September 22, 1923, is recorded with regret.

PAUL WILHELM RUDOLPH BOELKE.

IT is with regret that we have to announce the death of Dr. Paul Wilhelm Rudolph Boelke which occurred at Manly, New South Wales, on September 25, 1923.

HAROLD LYTTON CUMMINGS.

WE announce with regret the death of Dr. Harold Lytton Cummings which occurred suddenly on September 30, 1923.

Proceedings of the Australian Medical Boards.

QUEENSLAND.

THE undermentioned has been registered, under the provisions of the *Medical Act of 1867*, as a duly qualified medical practitioner:

MCCANN, FRANCIS BEDE, M.B., Ch.M., 1922 (Univ. Sydney), Taroom.

Additional Registration.

LUKIN, FRANCIS WILLIAM RENNICK, Ch.M., 1923 (Univ. Sydney), Albion, Brisbane.

Medical Appointments.

DR. C. CUNNINGHAM (B.M.A.) and DR. G. U. TAYLOR (B.M.A.) have been appointed Certifying Medical Practitioners at North Melbourne and at Wedderburn, respectively, under the provisions of the *Workers' Compensation Act, 1915*, of Victoria.

Medical Appointments Vacant, etc.

FOR announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser," page xviii.

CENTRAL EYRE'S PENINSULAR, S.A.: Resident Medical Practitioner.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429, Strand, London, W.C.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney	Australian Natives' Association Ashfield and District Friendly Societies' Dispensary Balmain United Friendly Societies' Dispensary Friendly Society Lodges at Casino Leichhardt and Petersham Dispensary Manchester Unity Oddfellows' Medical Institute, Elizabeth Street, Sydney Marrickville United Friendly Societies' Dispensary North Sydney United Friendly Societies People's Prudential Benefit Society Phœnix Mutual Provident Society
VICTORIA: Honorary Secretary, Medical Society Hall, East Melbourne	All Institutes or Medical Dispensaries Australian Prudential Association Proprietary, Limited Mutual National Provident Club National Provident Association
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane	Brisbane United Friendly Society Institute Stannary Hills Hospital
SOUTH AUSTRALIA: Honorary Secretary, 12, North Terrace, Adelaide	Contract Practice Appointments at Renmark Contract Practice Appointments in South Australia
WESTERN AUSTRALIA: Honorary Secretary, Saint George's Terrace, Perth	All Contract Practice Appointments in Western Australia
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington	Friendly Society Lodges, Wellington, New Zealand

Diary for the Month.

OCT. 9.—New South Wales Branch, B.M.A.: Ethics Committee.
OCT. 10.—Melbourne Pædiatric Society.
OCT. 10.—Western Australian Branch, B.M.A.: Council.
OCT. 12.—New South Wales Branch, B.M.A.: Clinical Meeting.
OCT. 12.—Queensland Branch, B.M.A.: Council.
OCT. 12.—South Australian Branch, B.M.A.: Council.
OCT. 16.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
OCT. 17.—Victorian Branch, B.M.A.: Council.
OCT. 17.—Western Australian Branch, B.M.A.: Branch.
OCT. 23.—New South Wales Branch, B.M.A.: Medical Politics Committee; Organization and Science Committee.
OCT. 25.—South Australian Branch, B.M.A.: Branch.
OCT. 25.—Brisbane Hospital for Sick Children: Clinical Meeting.
OCT. 26.—New South Wales Branch, B.M.A.: Branch.
OCT. 26.—Queensland Branch, B.M.A.: Council.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor," THE MEDICAL JOURNAL OF AUSTRALIA, B.M.A. Building, 30-34, Elizabeth Street, Sydney. (Telephone: B. 4635.)

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